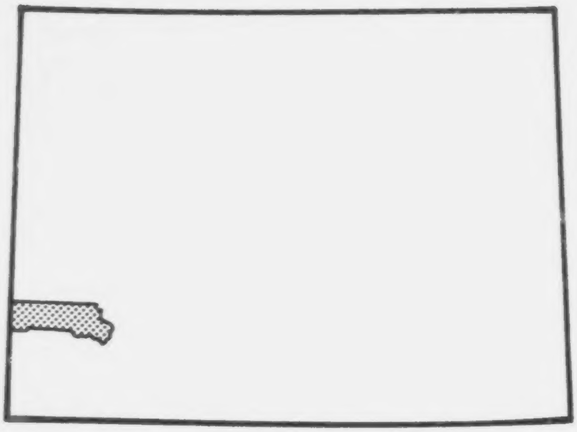
AUG 0 6 1988

FEM 1.209:080316, 080168, 080166

FLOOD INSURANCE STUDY

SAN MIGUEL COUNTY, COLORADO AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
SAWPIT, TOWN OF	080316
TELLURIDE, TOWN OF	080168
UNINCORPORATED AREAS	080166



SEPTEMBER 30, 1988

Federal Emergency Management Agency

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

TABLE OF CONTENTS

Page

1.0 INTRODUCTION 1

1.1 Purpose of Study 1
1.2 Authority and Acknowledgments 1
1.3 Coordination 2

2.0 AREA STUDIED 2

2.1 Scope of Study 2
2.2 Community Description 4
2.3 Principal Flood Problems 6
2.4 Flood Protection Measures 7

3.0 ENGINEERING METHODS 7

3.1 Hydrologic Analyses 8
3.2 Hydraulic Analyses 10

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS 12

4.1 Floodplain Boundaries 12
4.2 Floodways 14

5.0 INSURANCE APPLICATION 22

6.0 FLOOD INSURANCE RATE MAP 23

7.0 OTHER STUDIES 23

8.0 LOCATION OF DATA 25

9.0 BIBLIOGRAPHY AND REFERENCES 25

TABLE OF CONTENTS (cont.)

FIGURES

Page

Figure 1 - Vicinity Map 3
Figure 2 - Floodway Schematic 22

TABLES

Table 1 - Flooding Sources 4
Table 2 - Summary of Discharges 9
Table 3 - Floodway Data 15
Table 4 - Community Map History 24

EXHIBITS

Exhibit 1 - Flood Profiles

San Miguel River (At Placerville) Panels 01P-13P
San Miguel River (Near Telluride) Panels 14P-18P
San Miguel River Secondary Channel Panel 19P
Fall Creek Panels 20P-21P
Leopard Creek Panels 22P-24P

Exhibit 2 - Flood Insurance Rate Map Index
Flood Insurance Rate Map

Exhibit 3 - Elevation Reference Marks

FLOOD INSURANCE STUDY
SAN MIGUEL COUNTY, COLORADO
AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the geographic area of San Miguel County, Colorado, including the incorporated Towns of Norwood, Ophir, Sawpit, and Telluride; and the unincorporated areas of San Miguel County (hereinafter referred to collectively as San Miguel County), and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and to assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

This Flood Insurance Study revises and updates the previous Flood Insurance Studies/Flood Insurance Rate Map for the unincorporated areas of San Miguel County and the Town of Telluride. This information will be used by San Miguel County to update existing floodplain regulations as part of the Regular Phase of the NFIP. The information will also be used by local and regional planners to further promote sound land use and floodplain development.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for the initial study were performed by Camp, Dresser and McKee Inc. (CDM), Environmental Engineers, for the Federal Emergency Management Agency (FEMA), under Contract No. H-4014. This study was completed in February 1977.

Revisions to the riverine flooding along San Miguel River in the area of Placerville and through the Town of Telluride were based on information obtained from two reports prepared in April 1986 by Simons, Li & Associates, Inc. (References 1 and 2). These revisions were the result of floodplain modifications along San Miguel River including the construction of bridges, removal of bridges and the placement of fill.

1.3 Coordination

Upon initiation of the original study, a legal notice was placed in the Telluride Times on July 15, 1976, to notify all interested persons so they could submit any relevant facts and technical data concerning local flood hazards.

A search for basic data was made at all levels of government. Federal, state, and local agencies were contacted as to the availability of any reports, studies, or investigations which might contain information relative to flooding problems in the community.

An initial community coordination meeting was held on July 19, 1976. The meeting was attended by representatives of the Town of Telluride and San Miguel County; FEMA; the State Coordination Agency, the Colorado Water Conservation Board (CWCB); and CDM, the study contractor. The purpose of this meeting was to discuss the nature and purpose of the study, the scope and limits of work, and flood information currently available concerning the community.

During the course of the work for the initial study by CDM, the results of hydrologic analyses were reviewed by the U.S. Army Corps of Engineers (COE), Sacramento District, the U.S. Geological Survey (USGS), the U.S. Soil Conservation Service (SCS), and the CWCB. The final consultation and coordination meetings were held on Monday, August 15, 1977, at the San Miguel County Court House and the Town Hall of Telluride. In attendance were representatives of the communities, FEMA, the CWCB, and the study contractor. The results of the original study were presented to and accepted by the communities.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the geographic area of San Miguel County, Colorado. The area of study is shown on the Vicinity Map (Figure 1).

The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction.

Areas studied by detailed methods are shown in Table 1.

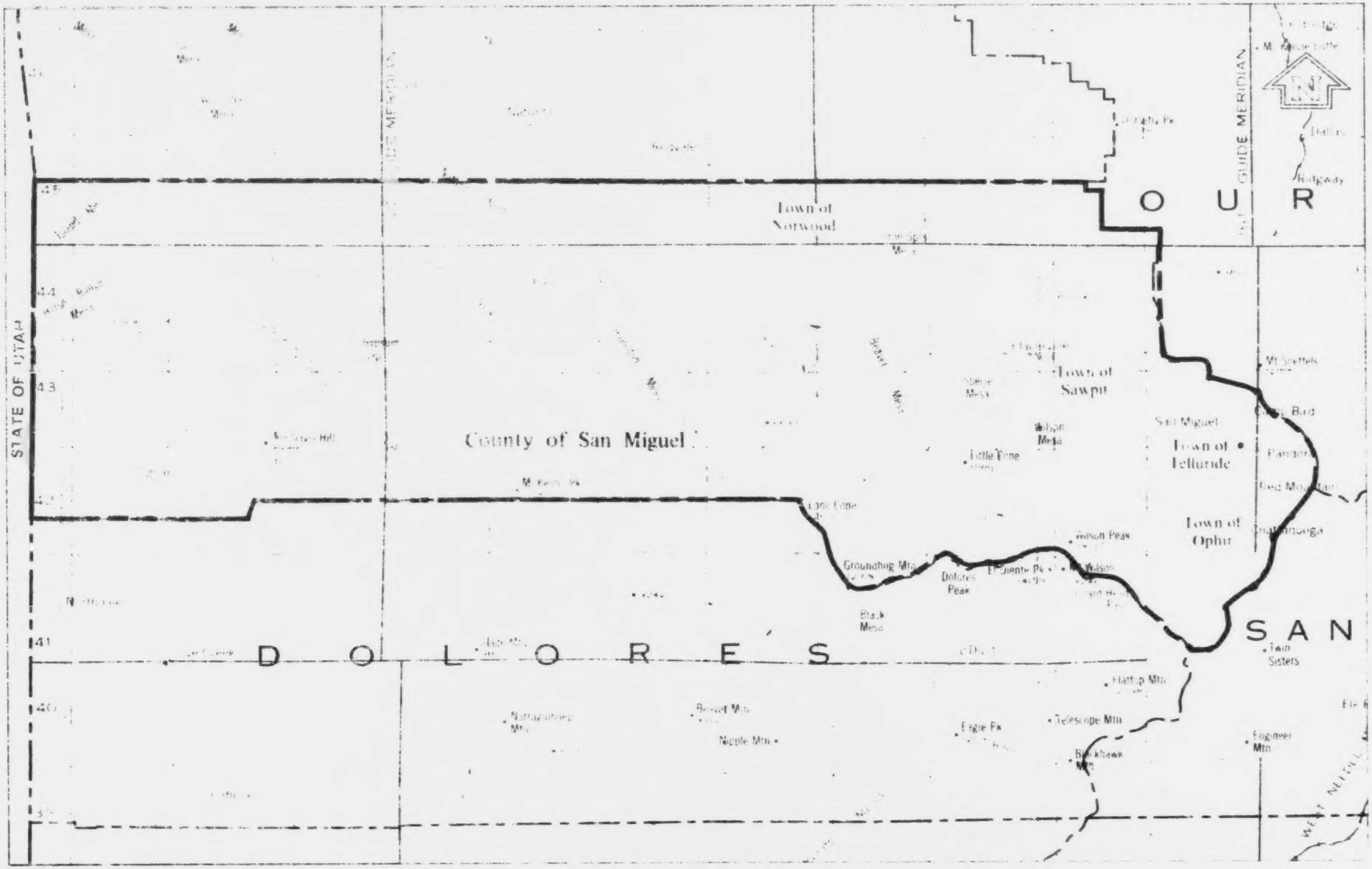

STATE OF UTAH
GUIDE MERIDIAN
GUIDE MERIDIAN
Town of Norwood
O U R
Ridgway
Dallas
Town of Sawpit
Town of Telluride
San Miguel
Town of Ophir
County of San Miguel
Mt Sneffels
Wilson Mesa
Little Cone
Lone Cone
Wilson Peak
Mt Wilson
Groundhog Mtn
Dolores Peak
El Diente Pk
Black Mesa
Red Mountain
Chattanooga
Pandora
D O L O R E S
S A N
Twin Sisters
Flattop Mtn
Telescope Mtn
Eagle Pk
Blackhawk Mtn
Engineer Mtn
Beaver Mtn
Nipple Mtn
McKenna Pk
WEST NEEDLE

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN MIGUEL COUNTY, CO
AND INCORPORATED AREAS

APPROXIMATE SCALE

8 0 8 16 24 MILES

VICINITY MAP

TABLE 1. FLOODING SOURCES STUDIED BY DETAILED METHODS

Flooding Source	Description of Study Limits
San Miguel River At Placerville	Beginning 0.6 mile downstream of Slaughterhouse Gulch and extending upstream 5.9 miles
San Miguel River Near Telluride	Beginning 350 feet downstream of Bridge No. 6 (State Highway 145) and extending upstream 5.5 miles
San Miguel River Near Telluride Secondary Channel	Beginning at the diversion with the San Miguel River and extending downstream 0.9 mile to its confluence (convergence) with the San Miguel River
Leopard Creek	Beginning at its confluence with the San Miguel River and extending upstream 0.8 mile
Fall Creek	Beginning at its confluence with the San Miguel River and extending upstream 0.7 mile
Cornet Creek	Beginning at its confluence with the San Miguel River and extending upstream 1.1 miles

The flooding sources studied by approximate methods and their mileage of approximate study are as follows: Gurley Ditch at Norwood, 1.5 miles; San Miguel River at Beaver Creek, 2.7 miles; Leopard Creek at Leonard, 3.4 miles; Alder Creek at Brown, 0.8 mile; San Miguel River west of Keystone, 1.4 miles; South Fork San Miguel River at Ilium, 3.4 miles; and South Fork San Miguel River at Ames and Ophir, 4.4 miles.

Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and San Miguel County.

2.2 Community Description

San Miguel County is bordered on the north by Montrose County, on the east by Ouray and San Juan Counties, on the south by Dolores County, and on the west by the State of Utah. According to 1980 census data, San Miguel County has a population of 3,192 (Reference 3). Census data for the incorporated towns are as follows:

Community	1980 Population
Town of Norwood	478
Town of Ophir	38
Town of Sawpit	41
Town of Telluride	1,047

The Town of Telluride, which is located in the southwestern part of the Colorado Mountain Region, is 13 miles to the east of the Town of Sawpit.

The San Miguel River watershed near Telluride encompasses approximately 42.4 square miles and consists of high mountainous terrain with steep to moderately steep slopes. Elevations range from approximately 8,650 feet to approximately 14,000 feet. The San Miguel River watershed at Placerville covers approximately 290 square miles. It also consists of high mountainous terrain with steep to moderately steep slopes. The elevation at Placerville is approximately 7,300 feet. The Leopard Creek watershed, which is a tributary of the San Miguel River at Placerville, covers approximately 62 square miles and rises to an elevation of approximately 9,800 feet. The Fall Creek watershed, which is also a tributary of the San Miguel River near the Town of Sawpit, comprises approximately 42 square miles and rises to an elevation of approximately 13,300 feet. Leopard Creek and Fall Creek flow through narrow canyons and their watersheds consist of high mountainous terrain with steep to moderately steep slopes. The Cornet Creek watershed, which is a tributary of the San Miguel River, covers approximately 2.4 square miles and rises to an elevation of approximately 13,300 feet. It consists of high mountainous terrain with steep to moderately steep slopes.

The annual precipitation in the Telluride area is approximately 27 inches, of which 10 inches occur between May and September. In the Placerville area the annual precipitation is approximately 16 inches, of which 6 inches occur between May and September. The annual mean temperature in the study area is approximately 40°F, which varies from 20°F in January to 60°F in July. Humidity is generally quite low, which allows for rapid evaporation (Reference 4). Generally, flooding occurs during periods of melting snow in June; precipitation is generally insufficient to cause floods, except through cloudbursts.

Soils of the San Miguel River watershed upstream of Telluride are of the Cryoboralfs-Cryoborulls-Rock Outcrop Associations, which are classified by the SCS as Hydrologic Soil Group C (soils having slow infiltration rates when thoroughly wetted), consisting chiefly of soils with a layer that impedes downward movement of water, or soils with moderately fine to fine texture. These soil have a slow rate of water transmission. Soils of the other study areas in San Miguel County are Cryoboralfs-Rock Outcrop Associations which are classified by the SCS as Hydrologic Soil Group D (high runoff potential). Vegetation in these areas consist of approximately 80 percent dense trees and 20 percent bushes, which retard potential runoff (Reference 5).

In the past, the prime economy of the county depended on mining and agricultural activities. In recent years, many changes have occurred within San Miguel County, certainly not the least of which has been the development of a major ski resort near the Town of Telluride. In addition, Colorado has become the center of a new market for mountain homesites usually to be used as second homes. As a result, the county has gradually moved toward a recreation-based economy.

2.3 Principal Flood Problems

The only severe floods in the San Miguel River basin for which definite information is available before 1948 were those of September 5, 1909, and October 5, 1911. The flood in 1909 caused the failure of two small Telluride Power Company power reservoirs of the Telluride Power Company on Lake Fork of the San Miguel River. The State Engineers, who made an investigation of these failures, stated that the property damage caused by the flood was "appalling." The flood in 1911 washed out railway tracks and public roads, caused the failure of Trout Lake Dam, and the loss of one life. The damage costs and recurrence intervals of the 1909 and 1911 floods cannot be estimated because historical data are sparse and of limited reliability. Floods also occurred in these areas to a lesser extent in 1913, 1923, 1927, 1964, and 1966 in the San Miguel basins.

Because Telluride lies on the alluvial fan of Cornet Creek, most of the flood problems in the Town of Telluride are caused by this creek. Flood hazards are due primarily to mud and debris flows. The upper portion of the Cornet Creek watershed consists of volcanic rock. Glacial erosion has left the south and southwest facing walls of Mount Emma, the St. Sophia Ridge, and Mednota Peak in a very steep and unstable condition. These walls are the primary source for mud flows. Heavy rainfall, especially when accompanied by saturated ground surface conditions, serves as the starting mechanism for downslope movement of debris on these walls.

Two of the most destructive mud and debris flows occurred during the floods of July 27, 1914, and August 1, 1969, which were caused by heavy rainfall preceded by a period of wet weather. It is likely that the flood was caused by large boulders and debris jamming the the narrow channel of Cornet Creek at various locations during the flood descent. During the cloudburst flood of July 27, 1914, as described in the San Miguel Examiner, a river of mud, its height very conservatively estimated at between 8 and 10 feet in height, swept out of Cornet Creek Canyon just north of the Town of Telluride and swept away everything in its path. The loss was estimated at about $250,000; one person was killed, and many were badly injured. The flood that occurred in 1969 was not as destructive as the flood of 1914 and was confined to the western part of town. Again, mud and debris flows were the principal factors. (Frequencies of major floods are not available.)

Past records indicate that most of the severe floods in this region were caused by cloudbursts, especially for small drainage basins. A flood resulting from a cloudburst rises so quickly that it has a peak duration of only a few minutes, followed by a rapid subsidence.

2.4 Flood Protection Measures

No specific flood protection structures have been constructed in the designated study areas. Some flood protection measures are provided, however, by San Miguel County Subdivision Regulations. Article VII (Special Regulations) of the Subdivision Regulations provides for the protection and control of marsh and lowlands and the floodplain within 100-year flood limits. Article IX (Improvement Standards) of the Subdivision Regulations provides control for new developments that should provide drainage and flood control facilities for 100-year frequency storm events and provide protection for structures within the 100-year floodplain.

3.0 ENGINEERING METHODS

For the flooding sources studied by detailed methods in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2- percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for each flooding source studied by detailed methods affecting the community.

Cornet Creek is ungaged and the gaging station on the San Miguel River near Telluride has only a five-year record (1961 to 1965). The gaging station on the San Miguel River near Placerville has a 40-year record. In order to have a consistent hydrologic analysis within San Miguel County, a regional relationship developed by the study contractor relating basin area to peak discharge was the method used for the San Miguel River. Gaging stations within hydrologic area No. 10 of flood frequency Region 8 (listed below) were used to establish the regional relationship.

USGS Station No.	Station Location	Drainage Area (sq. mi.)	Length of Record (years)	Period of Record
091450	Uncompahgre River at Ouray	44.0	14	1911-1924
091460	Uncompahgre River below Ouray	76.0	16	1914-1929
091464	West Fork Dallas Creek near Ridgeway	13.2	15	1956-1970
091465	East Fork Dallas Creek near Ridgeway	16.8	16	1948-1970
091650	Dolores River below Rico	105.0	25	1952-1976
091681	Disappointment Creek near Dover Creek	145.0	19	1958-1976
091720	Fall Creek 2.7 miles upstream from the mouth	33.5	18	1942-1959
091725	San Miguel River near Placerville	308.0	40	1930-1976
091745	Cottonwood Creek near Nucla	43.0	10	1942-1951
091750	Naturita Creek near Norwood	27.7	12	1942-1952
091755	San Miguel River at Naturita	1,080.0	48	1918-1976
091775	Taylor Creek near Gateway	12.0	26	1945-1967

The method developed by the U.S. Water Resources Council (Reference 6) was used to determine the floodflow frequency relationship based on log-Pearson Type III distribution for each selected gaging station. Gaging stations which have 10 or more years of record, and stations where peak flows are not affected by regulation and diversion were used for developing the regional relationship.

Because the annual peak discharge published in the USGS Water Supply Papers (References 7, 8, and 9) and the USGS Surface Water Records (Reference 10) were a mixture of floodflows caused by snowmelt and rainfall events, the regional relationship established by using these annual peak discharges does not reflect intense rainfall-produced floods. A more detailed method was used for each gaging station to develop regional relationships for this area. The procedures were as follows: (1) the rain and snowmelt data were separated at each gaging station, statistics were developed for each type of event, and the two frequency curves were statistically combined (streamflow records were obtained from the USGS, Denver Federal Center); (2) short period statistics were adjusted to reflect long period values if they were closely correlated; (3) outliers and historical data were considered during the development of flood-flow frequency relationships for each gaging station; and (4) regional relationships relating basin area to peak discharge for the 10-, 50-, 100-, and 500-year floods were developed.

The regional relationships relating basin area to peak discharge for the 10-, 50-, 100-, and 500-year floods thus established were employed to compute the peak discharges used for detailed hydraulic analyses at various locations for each of these floods, and 100-year peak discharges for the approximate methods. The regional relationships were considered valid only for watersheds having drainage areas larger than 10 square miles, which is the lower limit of the gaging stations used in regression analyses. Therefore, for Cornet Creek, which has a drainage area of 2.38 square miles, the SCS Curve Number technique was used to compute the 100-year flood discharge (Reference 11). The 10-, 50-, and 500-year floodflows on Cornet Creek were also estimated from the frequency-discharge curve drawn parallel to the curve obtained from the regression values.

Peak discharge-drainage area relationships for each stream studied by detailed methods in the community are shown in Table 2.

TABLE 2. SUMMARY OF DISCHARGES

Flooding Source and Location	Drainage Area (square miles)	Peak Discharges (cubic feet per second) 10-Year	50-Year	100-Year	500-Year
San Miguel River					
Just west of Placerville	289.6	3,210	5,150	6,210	9,550
Just downstream of Leopard Creek	285.8	3,180	5,100	6,150	9,430
Just upstream of Leopard Creek	223.4	2,660	4,320	5,250	8,220
Just downstream of Fall Creek	217.8	2,610	4,240	5,160	8,100
Just upstream of Fall Creek	175.8	2,230	3,670	4,490	7,160
Just east of Sawpit	168.6	2,160	3,570	4,370	6,990
At State Highway 145	42.4	790	1,390	1,790	3,150
At confluence of Eder Creek	35.37	690	1,230	1,590	2,830

TABLE 2. SUMMARY OF DISCHARGES (cont'd)

Flooding Source and Location	Drainage Area (square miles)	Peak Discharges (cubic feet per second)			
		10-Year	50-Year	100-Year	500-Year
San Miguel River (cont'd)					
At confluence of Mill Creek	27.68	580	1,040	1,360	2,460
At Telluride western corporate limit	26.48	560	1,010	1,320	2,420
At confluence of Cornet Creek	25.25	540	980	1,280	2,330
At Telluride eastern corporate limit	15.63	380	710	940	1,770
Leopard Creek	62.4	1,050	1,810	2,300	3,930
Fall Creek	42.0	780	1,390	1,780	3,130
Cornet Creek					
At confluence with San Miguel River	2.38	210	415	590 1,500*	1,300

*Mudflow Discharge

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross section data for streams in the area were obtained from aerial photographs (Reference 12); the below-water sections were obtained by field measurement. All bridges and culverts were measured to obtain elevation data and structural geometry.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross section locations are also shown on the Flood Insurance Rate Map (Exhibit 2).

Roughness coefficients (Manning's "n") were estimated by field inspection at each cross section and checked for reasonableness against a recognized standard text (Reference 13). Roughness values for the main channel range from 0.025 to 0.060; the overbank values range from 0.025 to 0.10.

On Cornet Creek, as evidenced in 1914 and 1969, the floodflows carried with them a great deal of debris and mud, and shallow flooding prevailed in Telluride whenever major floods occurred. For this reason, mudflow was considered in the hydraulic analysis. A 20 percent water content in the mudflow was assumed, which in turn yielded a 100-year mudflow discharge of 1,500 cubic feet per second (cfs). Due to inadequate channel capacity, this discharge was routed uniformly across the alluvial fan. Because of highly unpredictable flow direction, all possible flood routes were considered. Three cross sections perpendicular to the major axis of the fan were utilized in hydraulic computations for shallow flooding to determine average flood depths. Average depths were computed using Sribniy formula (Reference 14), a modified Manning's equation, as follows:

$$V = \frac{1.486}{(0.194S^{\frac{1}{4}})} H^{2/3} S^{1/2}$$

where V = the mean velocity in feet per second
H = the average depth in feet
S = the slope in feet/feet

The average depths and velocities at the three cross sections as shown on the Flood Insurance Rate Map (Exhibit 2) are shown in the following tabulation.

Cross Section	Average Depth (Feet)	Mean Velocity (feet per second)
1	0.9	2.6
2	2.0	6.8
3	2.7	10.9

For Cornet Creek, no flood profiles were developed and the 500-year flooding was not studied. The 10-year flooding was not studied because the average depth of 100-year flooding was no greater than three feet in this area.

The slope-area method was used for determination of starting water-surface elevations for all other stream studied by detailed methods. Water-surface profiles of selected recurrence intervals were developed using the COE HEC-2 step-backwater computer program (Reference 15). These water-surface profiles were computed to a 0.5 foot degree of accuracy. The locations of selected cross sections are shown on both the Flood Insurance Rate Map (Exhibit 2) and the water-surface profiles (Exhibit 1).

Approximate methods were used to study portions of the San Miguel River, a portion of Leopard Creek, South Fork San Miguel River, and Gurley Ditch. Since there is not any previous study in these areas, an area prone to flooding for the recurrence interval of

100-years was determined by hydraulic calculations, which included estimation of cross section and discharges to obtain depths of flow.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps; the description of the marks are presented in Elevation Reference Marks (Exhibit 3).

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages state and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist communities in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied by detailed methods, with the exception of Cornet Creek, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:2,400, with a contour interval of 2 feet (Reference 16).

For Cornet Creek, the boundaries of the 100-year shallow flood area were delineated using the hydraulic computational results, as described in Section 3.2, along with the results via geological approach furnished by the engineering consultant to the Town of Telluride (Reference 17). The 100-year floodplain boundaries were so delineated to include the entire area that is susceptible to the unpredictable floodflows in the alluvial fan. The 500-year floodplain boundaries, as developed via geological approach by the Town Engineering Consultant, were also shown on the Flood Insurance Rate Map (Exhibit 2).

For approximate areas, boundaries were delineated using USGS topographic maps at a scale of 1:24,000, with a contour interval of 40 feet (Reference 18). Additional approximate study areas were taken directly from the Flood Hazard Boundary Map for San Miguel County (Reference 19). The following tabulation lists the streams and their tributaries studied by approximate methods, obtained from the Flood Hazard Boundary Map:

Major Rivers	Tributaries
Dolores River	Mary Jane Draw Big Gypsum Creek McIntyre Canyon Creek Summit Canyon Creek Nicholas Wash Disappointment Creek One unnamed tributary
Disappointment Creek	Spring Creek Pine Arroyo Dawson Draw Three unnamed tributaries
Upper Portion of the San Miguel River	McKenzie Creek Beaver Creek Point Reservoir
McKenzie Creek	Sawdust Gulch East Fork of McKenzie Creek Three unnamed tributaries
Naturita Creek	Middle Naturita Creek West Naturita Creek
Dry Creek	West Fork Dry Creek East Fork Dry Creek Horse Creek Nelson Creek

Other Study Areas

Upper Portion of Leopard Creek
Cone Reservoir
Miromonte Reservoir
Lilylands Reservoir
Portion of San Miguel River below Sawpit
Portion of San Miguel River below Telluride
Silver Lake
Blue Lake
Mud Lake
Ingram Lake
Alta Lake
Cushman Lake
Lewis Lake
Lake Hope
Trout Lake
Priest Lake
Swamp Canyon Creek
Gurley Reservoir
Maverick Draw
Ed Draw

The 100- and 500-year floodplain boundaries are shown on the Flood Insurance Rate Map (Exhibit 2). On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AE, and AO); and the 500-year floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 100-year floodplain boundary is shown on the Flood Insurance Rate Map (Exhibit 2).

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the NFIP, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this study were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated at selected cross sections (Table 3). In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary has been shown.

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 2.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
San Miguel River (At Placerville)								
A	0	105	603	10.30	7204.8	7204.8	7205.6	0.8
B	225	110	503	12.34	7207.9	7207.9	7208.0	0.1
C	695	70	438	14.16	7214.3	7214.3	7214.3	0.0
D	955	90	476	12.96	7218.6	7218.6	7218.7	0.1
E	1,715	90	501	12.39	7227.3	7227.3	7227.3	0.0
F	1,915	150	877	7.08	7229.1	7229.1	7230.1	1.0
G	2,165	105	546	11.37	7230.8	7230.8	7231.0	0.2
H	2,345	110	526	11.80	7233.4	7233.4	7233.4	0.0
I	2,635	105	521	11.91	7237.5	7237.5	7237.5	0.0
J	3,045	110	539	11.51	7242.1	7242.1	7242.2	0.1
K	3,315	85	438	14.18	7245.7	7245.7	7246.0	0.3
L	3,505	140	936	6.63	7248.7	7248.7	7249.6	0.9
M	3,755	190	1,104	5.57	7249.6	7249.6	7250.6	1.0
N	4,125	95	509	12.09	7251.7	7251.7	7252.3	0.6
O	4,285	70	427	14.40	7254.1	7254.1	7254.1	0.0
P	4,755	110	594	10.36	7259.4	7259.4	7259.8	0.4
Q	5,235	110	557	11.05	7264.4	7264.4	7264.6	0.2
R	5,725	90	631	9.75	7269.3	7269.3	7269.7	0.4
S	6,015	80	513	11.99	7270.8	7270.8	7271.3	0.5
T	6,385	100	522	10.04	7273.8	7273.8	7274.3	0.5
U	6,868	215	989	5.30	7277.8	7277.8	7277.9	0.1
V	7,285	220	690	7.60	7282.8	7282.8	7282.8	0.0
W	7,695	200	631	8.30	7286.8	7286.8	7287.1	0.3
X	8,135	180	750	7.00	7290.3	7290.3	7290.9	0.6
Y	8,490	131	637	8.20	7292.8	7292.8	7293.0	0.2
Z	8,660	132	516	10.20	7295.2	7295.2	7295.3	0.1

[1] Feet Above Limit of Detailed Study (3200 Feet Downstream of Slaughterhouse Gulch)

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN MIGUEL COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

SAN MIGUEL RIVER (AT PLACERVILLE)

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
San Miguel River (At Placerville)								
AA	8,745	100	867	6.00	7302.3	7302.3	7302.3	0.0
AB	9,015	95	729	7.20	7302.4	7302.4	7302.4	0.0
AC	9,325	100	568	9.20	7302.0	7302.0	7302.5	0.5
AD	9,520	110	528	9.90	7303.4	7303.4	7303.7	0.3
AE	9,885	85	437	12.00	7306.6	7306.6	7306.6	0.0
AF	10,290	120	494	10.62	7311.6	7311.6	7311.6	0.0
AG	10,690	105	499	10.51	7316.2	7316.2	7316.2	0.0
AH	10,930	70	429	12.23	7318.1	7318.1	7318.8	0.7
AI	11,260	70	487	10.78	7322.5	7322.5	7322.5	0.0
AJ	11,600	65	388	13.52	7324.0	7324.0	7324.4	0.4
AK	11,950	70	432	12.40	7328.8	7328.8	7329.0	0.2
AL	12,330	80	415	12.64	7333.7	7333.7	7333.7	0.0
AM	12,840	80	502	10.45	7339.4	7339.4	7339.5	0.1
AN	13,160	79	406	12.90	7343.0	7343.0	7343.0	0.0
AO	13,600	94	473	11.10	7351.8	7351.8	7351.9	0.1
AP	14,000	121	761	6.90	7356.0	7356.0	7356.9	0.9
AQ	14,535	47	340	15.40	7360.5	7360.5	7360.6	0.1
AR	15,220	84	443	11.90	7369.2	7369.2	7369.3	0.1
AS	15,600	69	403	13.00	7373.4	7373.4	7373.8	0.4
AT	16,270	79	478	11.00	7381.3	7381.3	7382.1	0.8
AU	16,960	80	495	10.60	7388.2	7388.2	7388.2	0.0
AV	17,430	103	627	8.40	7391.5	7391.5	7392.0	0.5
AW	17,695	51	356	14.50	7394.2	7349.2	7394.7	0.5
AX	18,345	63	372	13.90	7400.2	7400.2	7400.5	0.3
AY	18,940	105	649	8.00	7410.1	7410.1	7410.1	0.0
AZ	19,370	112	519	9.90	7411.5	7411.5	7412.0	0.5

[1] Feet Above Limit of Detailed Study (3200 Feet Downstream of Slaughterhouse Gulch)

FLOODWAY DATA

SAN MIGUEL RIVER (AT PLACERVILLE)

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET NGVD)
San Miguel River (At Placerville)								
BA	19,840	128	556	9.30	7417.0	7417.0	7417.0	0.0
BB	20,220	170	630	8.19	7420.0	7420.0	7420.0	0.0
BC	28,890	100	436	11.84	7426.6	7426.6	7426.6	0.0
BD	21,260	115	492	10.49	7431.3	7431.3	7431.3	0.0
BE	21,690	140	593	8.70	7435.6	7435.6	7435.6	0.0
BF	21,880	145	541	9.54	7440.0	7440.0	7440.0	0.0
BG	22,060	170	552	9.35	7442.0	7442.0	7442.0	0.0
BH	22,640	95	389	11.55	7448.9	7448.9	7448.9	0.0
BI	22,790	55	342	13.12	7453.1	7453.1	7453.1	0.0
BJ	22,270	70	418	10.74	7455.9	7455.9	7456.9	1.0
BK	23,880	70	356	12.61	7464.3	7464.3	7464.3	0.0
BL	24,290	105	546	8.23	7470.1	7470.1	7470.6	0.5
BM	24,500	105	440	10.21	7473.0	7473.0	7473.0	0.0
BN	24,710	60	334	13.45	7476.3	7476.3	7476.6	0.3
BO	25,060	70	499	9.00	7480.9	7480.9	7481.6	0.7
BP	25,340	65	399	11.27	7482.9	7482.9	7483.2	0.3
BQ	25,790	90	384	11.69	7490.0	7490.0	7490.0	0.0
BR	26,590	65	409	10.99	7500.1	7500.1	7501.0	0.9
BS	27,300	75	380	11.51	7510.2	7510.2	7510.2	0.0
BT	28,290	55	345	12.67	7523.1	7523.1	7523.4	0.3
BU	29,590	70	404	10.83	7541.2	7541.2	7541.4	0.2
BV	29,690	55	317	13.79	7542.1	7542.1	7542.1	0.0
BW	29,750	50[2]	306	14.30	7543.1	7543.1	7543.1	0.0
BX	30,235	50	317	13.79	7550.2	7550.2	7550.4	0.2
BY	30,525	50	347	12.60	7555.1	7555.1	7555.1	0.0
BZ	30,715	50	331	13.21	7557.0	7557.0	7557.0	0.1
CA	30,895	50	304	14.38	7561.1	7561.1	7561.1	0.0

[1] Feet Above Limit of Detailed Study (3200 Feet Downstream of Slaughterhouse Gulch)
[2] This Width Extends Beyond Study Area

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN MIGUEL COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

SAN MIGUEL RIVER (AT PLACERVILLE)

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
San Miguel River (Near Telluride)								
A	0	45	213	8.4	8636.5	8636.5	8637.5	1.0
B	250	105	381	4.7	8638.9	8638.9	8639.0	0.1
C	275	20	128	14.0	8639.9	8639.9	8640.0	0.1
D	355	20	166	10.8	8642.3	8642.3	8642.3	0.0
E	435	80	611	2.9	8644.8	8644.8	8644.8	0.0
F	770	200	1,115	1.6	8644.8	8644.8	8644.8	0.0
G	1,220	270	1,155	1.5	8644.8	8644.8	8644.9	0.1
H	1,700	170	825	2.2	8644.8	8644.8	8644.9	0.1
I	2,180	110	283	6.3	8645.0	8645.0	8645.1	0.1
J	3,080	170	432	4.1	8647.9	8647.9	8648.9	1.0
K	4,030	82	244	3.6	8651.2	8651.2	8651.5	0.3
L	4,920	124	230	3.8	8652.3	8652.3	8653.3	1.0
M	6,200	95	251	3.5	8658.3	8658.3	8659.3	1.0
N	7,290	85	163	5.4	8664.5	8664.5	8665.1	0.6
O	7,600	160	255	3.5	8666.4	8666.4	8666.4	0.0
P	7,910	115	128	6.9	8667.5	8667.5	8667.5	0.0
Q	8,310	120	238	6.7	8670.3	8670.3	8670.3	0.0
R	8,750	72	204	7.8	8672.6	8672.6	8672.6	0.0
S	8,955	105	214	7.4	8674.0	8674.0	8674.2	0.2
T	9,160	130	274	5.8	8676.0	8676.0	8676.0	0.0
U	9,470	110	237	6.7	8677.2	8677.2	8677.7	0.5
V	9,780	53	171	9.3	8679.4	8679.4	8679.8	0.4
W	10,330	55	162	8.4	8683.5	8683.5	8684.2	0.7
X	10,740	70	235	5.8	8686.4	8686.4	8687.1	0.7
Y	11,510	55	182	7.5	8690.1	8690.1	8690.1	0.0
Z	12,020	75	180	7.6	8692.3	8692.3	8692.5	0.2

---

[1] Feet Above Limit of Detailed Study (350 Feet Downstream of State Highway 145)

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

**SAN MIGUEL COUNTY, CO
AND INCORPORATED AREAS**

FLOODWAY DATA

SAN MIGUEL RIVER (NEAR TELLURIDE)

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
San Miguel River (Near Telluride)								
AA	12,530	120	204	6.7	8696.8	8696.8	8696.8	0.0
AB	13,040	145	270	5.0	8699.5	8699.5	8699.6	0.1
AC	13,140	145	208	6.5	8700.0	8700.0	8700.0	0.0
AD	13,400	80	435	3.0	8706.1	8706.1	8706.1	0.0
AE	14,010	85	309	4.4	8706.1	8706.1	8706.1	0.0
AF	14,620	85	192	7.1	8706.3	8706.3	8707.3	1.0
AG	15,720	160	381	3.6	8711.5	8711.5	8712.0	0.5
AH	16,380	70	153	8.9	8713.9	8713.9	8714.8	0.9
AI	17,308	63	316	4.2	8717.2	8717.2	8718.1	0.9
AJ	17,765	50	196	6.7	8720.7	8720.7	8720.8	0.1
AK	17,828	56	416	3.2	8725.9	8725.9	8726.2	0.3
AL	18,188	57	305	4.3	8726.2	8726.2	8726.5	0.3
AM	18,275	50	272	4.9	8726.3	8726.3	8726.6	0.3
AN	19,000	58	233	5.5	8728.1	8728.1	8728.4	0.3
AO	19,040	89	610	2.[illegible]	8731.2	8731.2	8731.2	0.0
AP	19,580	48	138	9.3	8732.3	8732.3	8732.4	0.1
AQ	20,145	56	253	5.1	8741.6	8741.6	8741.6	0.0
AR	20,215	53	182	7.0	8741.6	8741.6	8741.7	0.1
AS	20,[illegible]35	53	259	4.9	8746.6	8746.6	8747.7	0.4
AT	20,820	56	269	4.8	8746.6	8746.6	8747.0	0.4
AU	21,105	50	200	6.4	8747.0	8747.0	8747.9	0.9
AV	21,130	54	214	6.0	8747.4	8747.4	8748.4	0.0
AW	22,000	54	214	6.0	8752.5	8752.5	8752.5	0.0
AX	22,260	46	202	6.3	8755.1	8755.1	8755.2	0.1
AY	22,300	45	208	6.2	8755.1	8755.1	8755.2	0.1
AZ	22,735	130	280	4.6	8759.2	8759.2	8759.3	0.1

[1] Feet Above Limit of Detailed Study (350 Feet Downstream of State Highway 145)

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN MIGUEL COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

SAN MIGUEL RIVER (NEAR TELLURIDE)

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH[2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
San Miguel River (Near Telluride)								
BA	22,765	130	620	2.1	8761.5	8761.5	8762.3	0.8
BB	23,735[1]	65	195	6.6	8764.0	8764.0	8764.0	0.0
BC	24,545[1]	47	158	8.1	8777.6	8777.6	8777.6	0.0
BD	24,891[1]	41	205	6.3	8779.0	8779.0	8779.0	0.0
BE	25,531[1]	69	151	6.2	8782.3	8782.3	8782.4	0.1
BF	26,121[1]	35	98	9.6	8791.3	8791.3	8791.3	0.0
BG	26,961[1]	42	122	7.7	8799.4	8799.4	8799.6	0.2
BH	27,331[1]	70	112	8.4	8812.9	8812.9	8812.9	0.0
BI	27,551[1]	35	90	10.4	8818.0	8818.0	8818.0	0.0
BJ	27,671[1]	40	234	4.0	8826.4	8826.4	8826.4	0.0
BK	28,121[1]	65	98	9.6	8827.9	8827.9	8827.9	0.0
BL	28,721[1]	110	127	7.4	8840.6	8840.6	8840.6	0.0
BM	28,921[1]	45	106	8.9	8847.6	8847.6	8847.8	0.2
San Miguel River Secondary Channel								
A	455[2]	855	237	3.8	8653.2	8653.2	8653.3	0.1
B	1,055[2]	60	188	4.8	8653.9	8653.9	8654.7	0.8
C	1,705[2]	156	589	1.5	8654.3	8654.3	8655.2	0.9
D	2,515[2]	85	127	7.2	8657.1	8657.1	8657.9	0.8
E	3,065[2]	210	295	3.1	8662.0	8662.0	8662.1	0.1
F	3,665[2]	65	114	8.0	8666.1	8666.1	8666.1	0.0
G	4,075[2]	105	271	3.4	8668.1	8668.1	8668.2	0.1

[1] Feet Above Limit of Detailed Study (350 Feet Downstream of State Highway 145)

[2] Feet Above Confluence With San Miguel River

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN MIGUEL COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

SAN MIGUEL RIVER (NEAR TELLURIDE) - SAN MIGUEL RIVER SECONDARY CHANNEL

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Fall Creek								
A	385	110	371	4.69	7459.9	7452.9	7453.9	1.0
B	555	70	226	7.87	7458.1	7458.1	7458.4	0.3
C	855	105	265	6.71	7467.9	7467.9	7468.0	0.1
D	1,085	90	237	7.51	7474.6	7474.6	7474.6	0.0
E	1,315	60	223	7.98	7481.4	7481.4	7481.4	0.0
F	1,375	65	371	4.80	7484.9	7484.9	7485.9	1.0
G	1,525	55	196	9.08	7486.8	7486.8	7487.1	0.3
H	1,735	70	200	8.90	7493.0	7493.0	7493.0	0.0
I	2,005	100	260	6.84	7503.0	7503.0	7503.0	0.0
J	2,685	75	219	8.12	7524.0	7524.0	7524.0	0.0
K	3,365	80	220	8.09	7545.2	7545.2	7545.2	0.0
L	3,735	92	250	7.12	7559.0	7559.0	7559.1	0.1
Leopard Creek								
A	200	55	266	8.64	7273.8	7273.8	7274.8	1.0
B	295	55	220	10.45	7275.5	7275.5	7275.5	0.0
C	415	57	228	10.08	7277.6	7277.6	7277.7	0.1
D	545	58	268	8.58	7279.5	7279.5	7279.5	0.0
E	735	57	205	11.21	7283.0	7283.0	7283.0	0.0
F	885	50	300	7.66	7284.4	7284.4	7285.0	0.6
G	1,115	52	230	10.00	7286.5	7286.5	7286.5	0.0
H	1,665	64	288	7.98	7293.6	7293.6	7294.4	0.8
I	2,035	60	245	9.38	7300.8	7300.8	7300.8	0.0
J	2,735	70	302	7.61	7309.5	7309.5	7309.8	0.3
K	3,605	60	237	9.70	7326.6	7323.6	7323.7	0.1
L	4,305	75	247	9.31	7338.9	7338.9	7338.9	0.0
M	4,985	55	219	10.50	7349.9	7349.9	7350.0	0.2
N	5,585	50	204	11.27	7360.9	7360.9	7361.4	0.5
O	6,334	60	268	8.58	7374.4	7374.4	7374.9	0.5
P	6,995	50	214	10.74	7386.3	7386.3	7386.4	0.1

[1] Feet Above Confluence with San Miguel River

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN MIGUEL COUNTY, CO
AND INCORPORATED AREAS

FLOODWAY DATA

FALL CREEK - LEOPARD CREEK

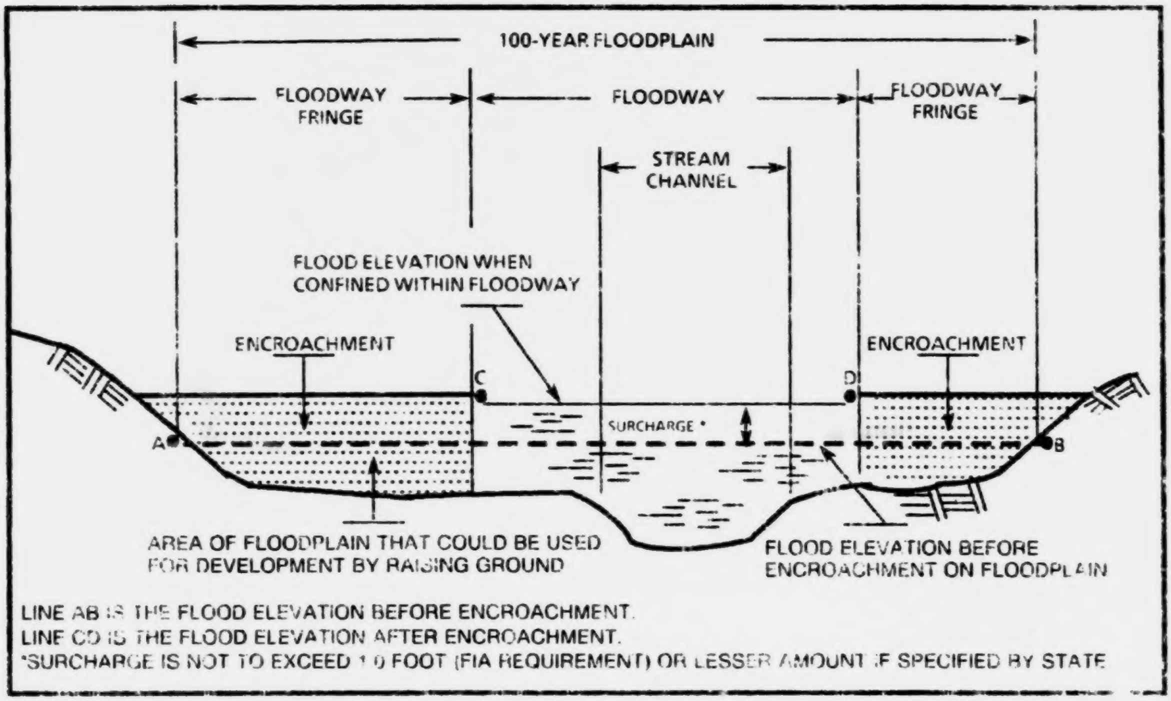

100-YEAR FLOODPLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE *
A
B
AREA OF FLOODPLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOODPLAIN
LINE AB IS THE FLOOD ELEVATION BEFORE ENCROACHMENT.
LINE CD IS THE FLOOD ELEVATION AFTER ENCROACHMENT.
*SURCHARGE IS NOT TO EXCEED 1.0 FOOT (FIA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE

Figure 2. Floodway Schematic

5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains determined in the Flood Insurance Study by detailed methods. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheetflow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the detailed hydraulic analyses are shown within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain, areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 100- and 500-year floodplains, floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

The current Flood Insurance Rate Map presents flooding information for the entire geographic area of San Miguel County. Previously, separate Flood Hazard Boundary Maps and/or Flood Insurance Rate Maps were prepared for each identified flood-prone incorporated community and the unincorporated areas of the county. Historical data relating to the maps prepared for each community are presented in Community Map History (Table 4).

7.0 OTHER STUDIES

Similar studies relating to flooding from the San Miguel River and Cornet Creek within the Town of Telluride have been prepared by Woodward-Clevenger and Associates, Inc. (Reference 20), Wing Engineering, Inc. (Reference 21), and the Institute of Arctic and Alpine Research, (Reference 22, 23, and 24). The 100-year flood depths in the San Miguel River were estimated to be approximately 6.0 feet at several locations by Woodward-Clevenger and Associates, Inc., in their

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP	EFFECTIVE DATE(S) OF MAP/PANEL REVISIONS
Sawpit, Town of	September 30, 1988	None	September 30, 1988	
Telluride, Town of	June 28, 1984	January 2, 1976	September 30, 1988	
Unincorporated Areas	September 29, 1978	None	September 30, 1988	

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN MIGUEL COUNTY, CO AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

1972 report. The 100-year flood depths of this study for the San Miguel River range from 4 to 7 feet. The differences noted between the studies were discussed with Woodward-Clevenger and Associates and it was agreed that the present Flood Insurance Study is more accurate because of the availability of more recent topographic mapping and a better hydraulic model.

The flood studies of Wing Engineering, Inc., and the Institute of Arctic and Alpine Research contained discharges for Cornet Creek and the San Miguel River, respectively. Based on a discussion with the regional FEMA Technical Representative, the differences in the hydrologic results of the above-mentioned flood studies and the current Flood Insurance Study for San Miguel County were attributed to improved hydrologic methodologies prepared by the study contractor.

Because of its more detailed analysis, this study supersedes the Flood Hazard Boundary Maps for San Miguel County.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, FEMA, Denver Federal Center, Building 710, Box 25267, Denver, Colorado 80225-0267.

9.0 BIBLIOGRAPHY AND REFERENCES

1. Simons, Li & Associates, Inc., Floodplain Revisions to the San Miguel River, San Miguel County, Colorado, April 1986.

2. Simons, Li & Associates, Inc., San Miguel River at Telluride, Colorado, Floodplain Study, April 1986.

3. U.S. Department of Commerce, Bureau of the Census, 1980 Census of Population, Number of Inhabitants, Colorado, October, 1981.

4. U.S. Department of Commerce, Weather Bureau, Climate of the States-Colorado, 1959

5. U.S. Department of Agriculture, Soil Conservation Service, General Soil Map of San Miguel County, Colorado, May 1972.

6. U.S. Water Resources Council, Hydrology Committee, Bulletin No. 17B, Guidelines for Determining Flood Flow Frequency, 1976.

7. U.S. Department of the Interior, Geological Survey, Colorado River Basin Water-Supply Paper 1683, Magnitude and Frequency of Floods in the United States, Part 9, 1966.

8. U.S. Department of the Interior, Geological Survey, Colorado River Basin Water-Supply Paper 1924, Surface Water Supply of the United States 1961-1965, Part 9, 1970.

9. U.S. Department of the Interior, Geological Survey, Colorado River Basin Water-Supply Paper 2124, Surface Water Supply of the United States 1966-1970, Part 9, 1973.

10. U.S. Department of the Interior, Geological Survey, Surface Water Records, Water Resources Data for Colorado, Part 1, 1971-1974.

11. U.S. Department of Agriculture, Soil Conservation Service, Procedures for Determining Peak Flows in Colorado, Incorporates and Supplements Technical Release No. 55, Urban Hydrology for Small Watersheds, 1975.

12. Colorado Water Conservation Board, Aerial Photographs by Kucera and Associates, Scale 1:6,000: Telluride Area, 1975; Placerville Area, 1976.

13. Chow, Ven Te, Open Channel Hydraulics. New York: McGraw-Hill Book Company, 1959.

14. Gol'din, B. M. and L. S. Lyubashevskiy, Computation of the Velocity of Mudflows for Crimean Rivers, Soviet Hydrology, No. 2, 1966.

15. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2, Water-Surface Profiles, Generalized Computer Program, Davis, California, October 1973.

16. Colorado Water Conservation Board, San Miguel River Map, Scale 1:2,400, Contour Interval 2 feet: San Miguel County, 1975.

17. O'Boyle, P. S., Consultant to the Town of Telluride, "Letter Communication," September 1, 1977.

18. U.S. Geological Survey, 7.5 Minute Services Topographic Maps, Scale 1:24,000, Contour Interval 40 feet: Gray Head, Colorado 1953; Telluride, Colorado 1955; Ophir, Colorado 1955; Mount Wilson, Colorado 1953; Gurley Canyon, Colorado 1964; Norwood, Colorado 1964; Placerville, Colorado 1953.

19. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, Unincorporated Areas of San Miguel County.

20. Woodward-Clevenger and Associates, Inc., Flood Studies for Telluride Ski Development Near Telluride, Colorado, 1972.

21. Wing Engineering, Inc., Cornet Creek-Flood Study, 1975.

22. Institute of Arctic and Alpine Research (INSTAAR), Flood Hazard of the San Miguel River at Telluride, University of Colorado, 1973.

23. Institute of Arctic and Alpine Research, Mud Flow Hazard on Cornet Creek at Telluride, University of Colorado, 1974.

24. Institute of Arctic and Alpine Research, *Debris Flow Hazard on Cornet Creek at Telluride*, University of Colorado, 1974.

Carrara, P.E. and A. I. Mears, *Geologic Hazards of the Telluride Area*, INSTAAR, University of Colorado, 1974.

Colorado Water Conservation Board, *Manual for Estimating Flood Characteristics of Natural-Flow Stream in Colorado*, 1976.

National Oceanic and Atmospheric Administration, Atlas 2, *Precipitation-Frequency Atlas of the Western United States*, Volume III, Colorado, 1973.

San Miguel County Planning Department, *Comprehensive Development Plan for the Placer Valley Area*, 1975.

San Miguel County Planning Department, *Comprehensive Development Plan for the San Miguel Canyon Area*, 1976.

San Miguel County Planning Department, *Comprehensive Development Plan for the Telluride - Regional Area*, 1975.

U.S. Department of Housing and Urban Development, Federal Insurance Administration, *Flood Insurance Study Guidelines and Specifications*, 1976.

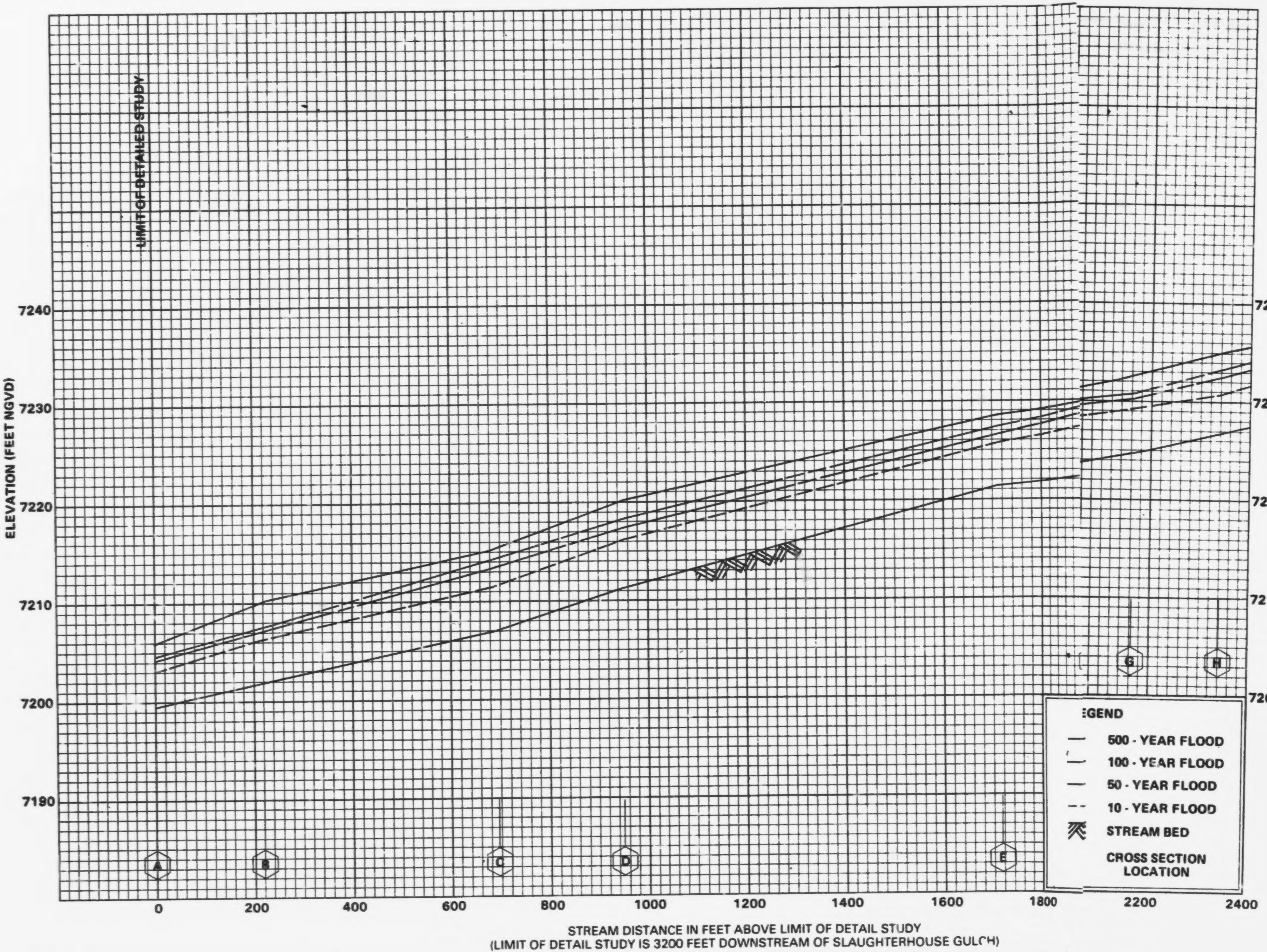
U.S. Geological Survey, Water Supply Paper 997, *Floods in Colorado*, 1948.

U.S. Geological Survey, *Stream Flow Records*.

Woodward-Clevenger and Associates, Inc., *Flood Studies for Telluride Ski Development Near Telluride, Colorado*, 197[illegible].

EXHIBIT 3 - ELEVATION REFERENCE MARKS

Reference Mark	Elevation (feet NGVD)	Description of Location
RM 1	7527.02	A disc stamped "X147" set in top of concrete post located 3.4 miles southeast along Rio Grande and Southern Railroad abandoned right-a-way from station at Placerville, 0.3 miles southwest of Sawpit, 165 feet southwest of a culvert, 66 feet southeast of centerline of State Highway 145.
RM 2	7394.01	A disc stamped "W147 1934" set in the top of a concrete post located 1.4 miles southwest of Placerville station along abandoned right-a-way of Rio Grande and Southern Railroad, 120 feet southwest of a centerline of State Highway 145 in the center of a barrow pit.
RM 3	7243.96	A brass cap in concrete post located on side of State Highway 145, 1 mile west of intersection with State Highway.
RM 4	7378.29	A disc stamped "H147 1934" set in the top of a concrete post located 1.6 miles northeast along the Rio Grande to Southern Railroad from station in Placerville, 3 feet west of milepost R25, 250 feet west of centerline of State Highway 62.
RM 5	8731.90	A brass cap set in concrete post located in south shoulder of State Highway 145 about 1/4 mile west of Telluride.
RM 6	8791.38	A 2-inch cap marker set in concrete on south side of State Highway 145 opposite Telluride Cemetery.
RM 7	8876.31	Standard Tablet stamped "1927 H41-8876" on top of prominent red boulder located 100 feet north of courthouse, 100 feet north of Telluride Avenue and North Oak Street intersection, east os Smuggler Mine.



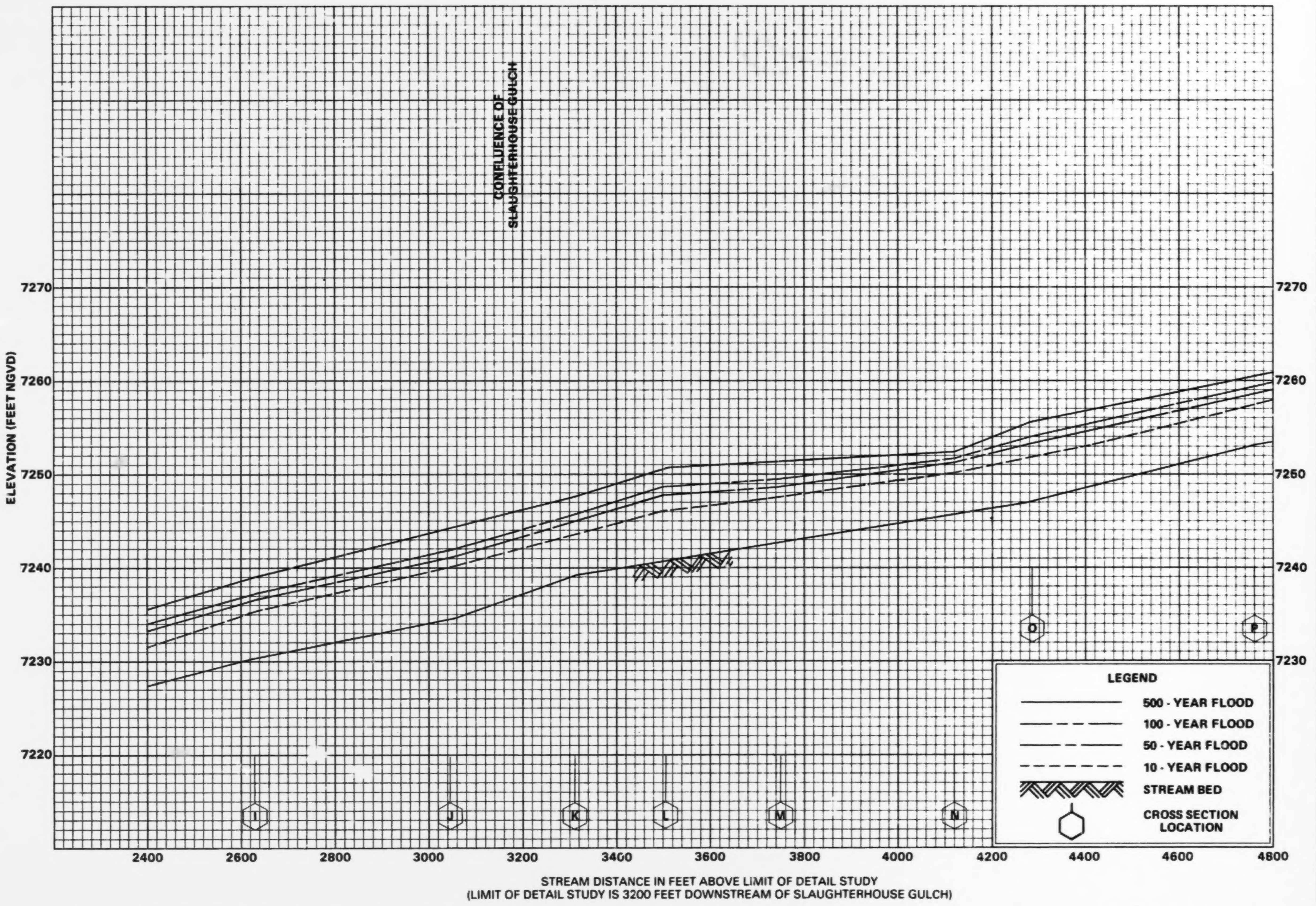
FLOOD PROFILES

SAN MIGUEL RIVER (AT PLACERVILLE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN MIGUEL COUNTY, CO
AND INCORPORATED AREAS

01P



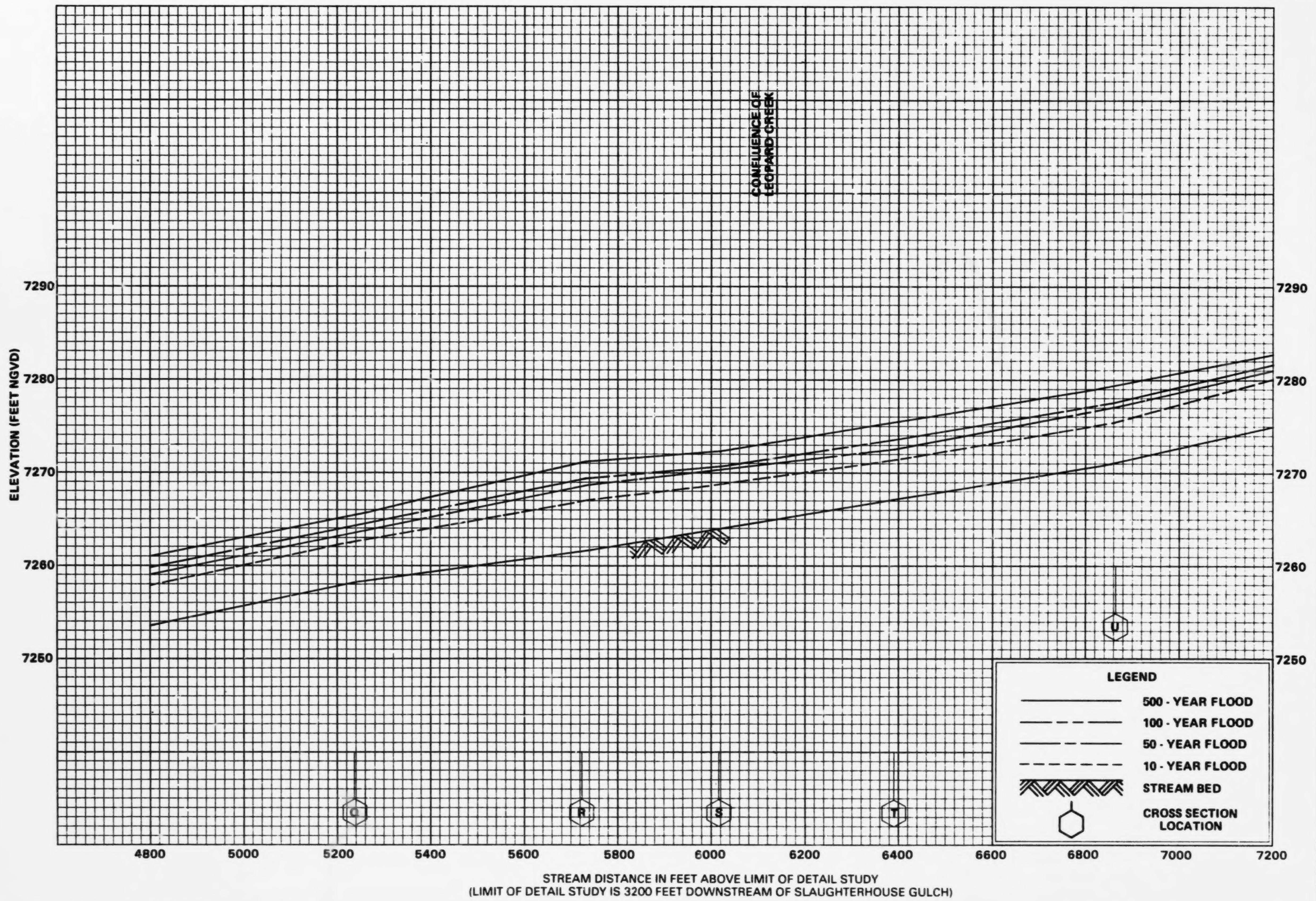
FLOOD PROFILES

SAN MIGUEL RIVER (AT PLACERVILLE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN MIGUEL COUNTY, CO
AND INCORPORATED AREAS

02P



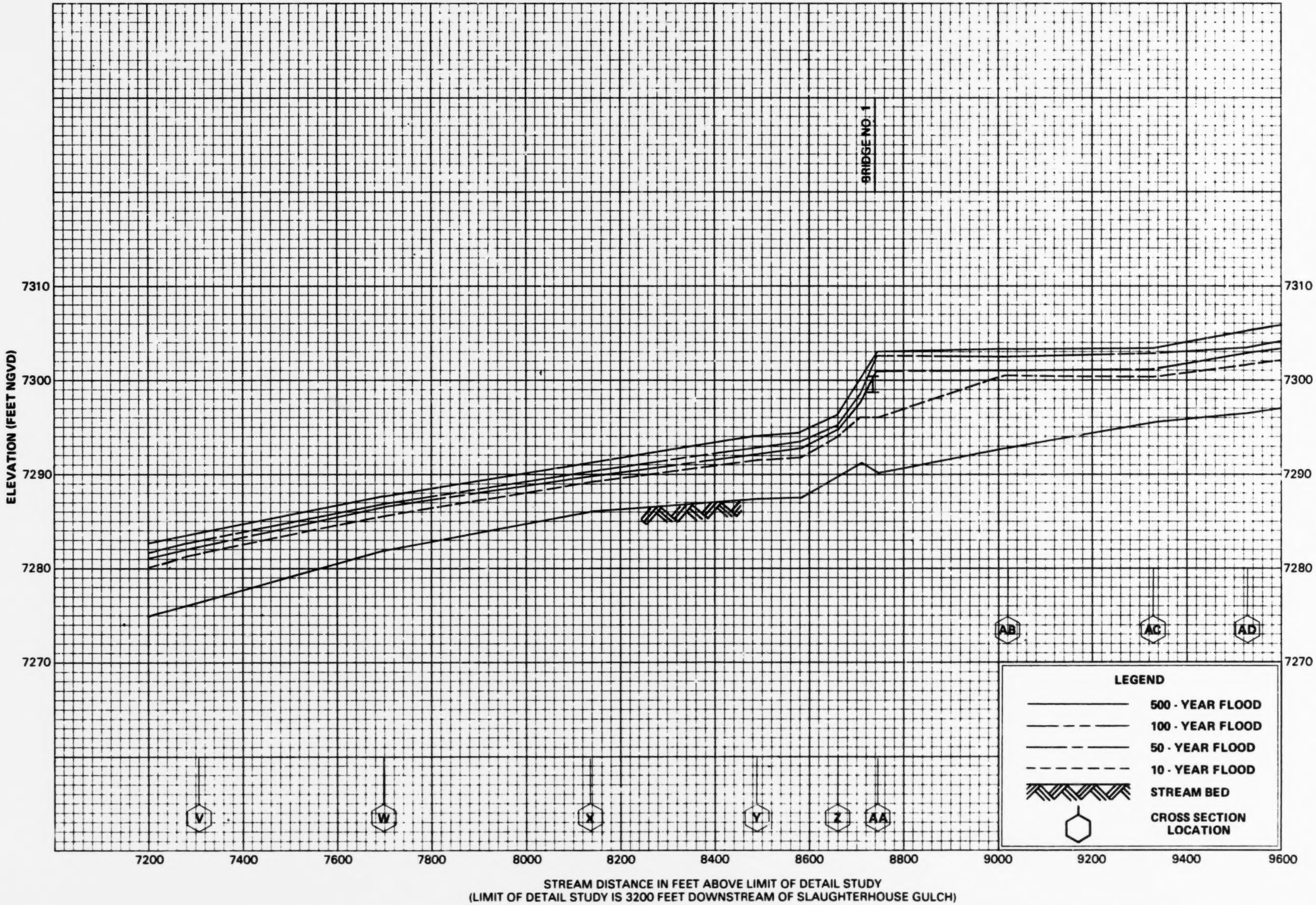
FLOOD PROFILES

SAN MIGUEL RIVER (AT PLACERVILLE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN MIGUEL COUNTY, CO AND INCORPORATED AREAS

03P



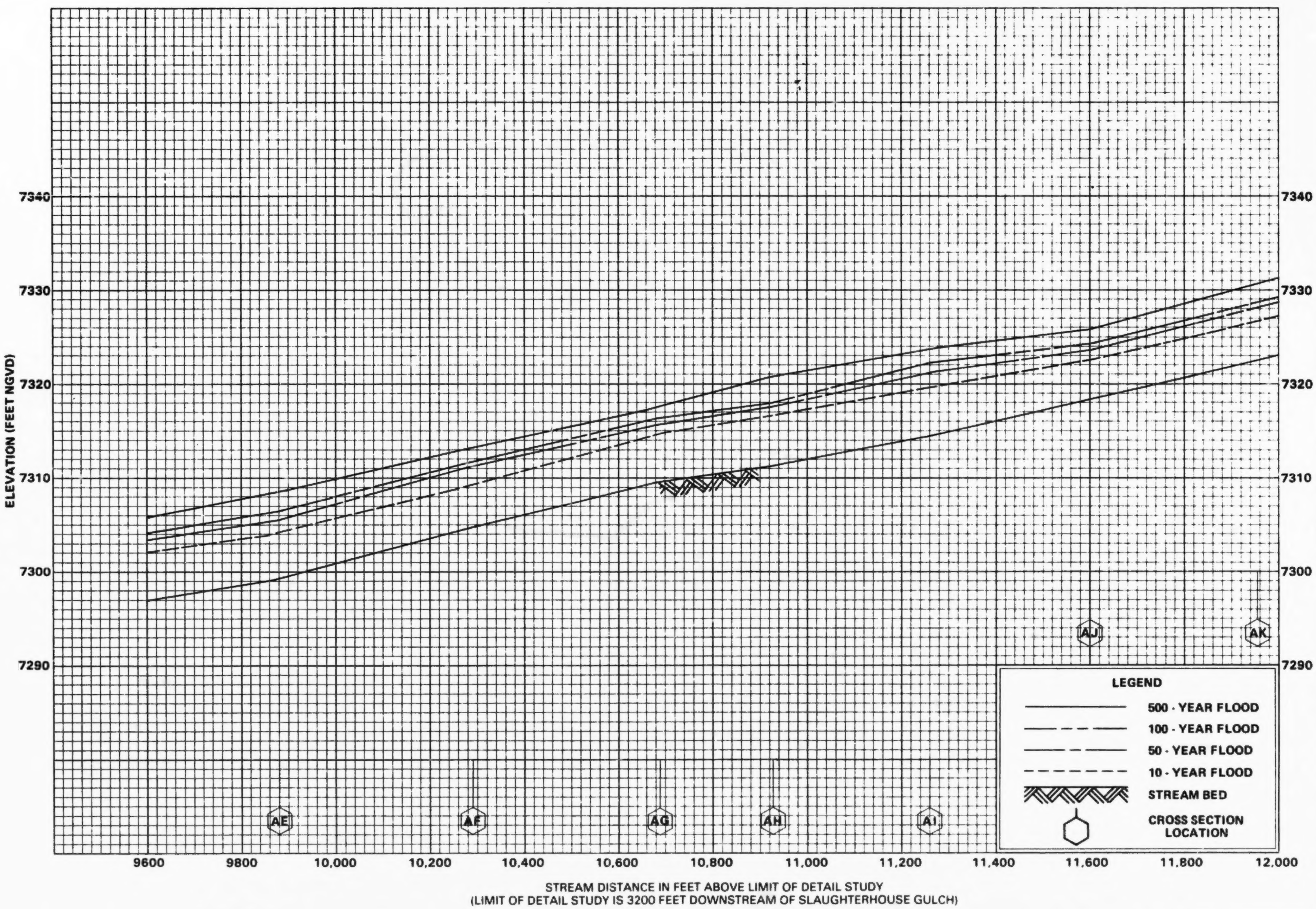
FLOOD PROFILES

SAN MIGUEL RIVER (AT PLACERVILLE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN MIGUEL COUNTY, CO
AND INCORPORATED AREAS

04P



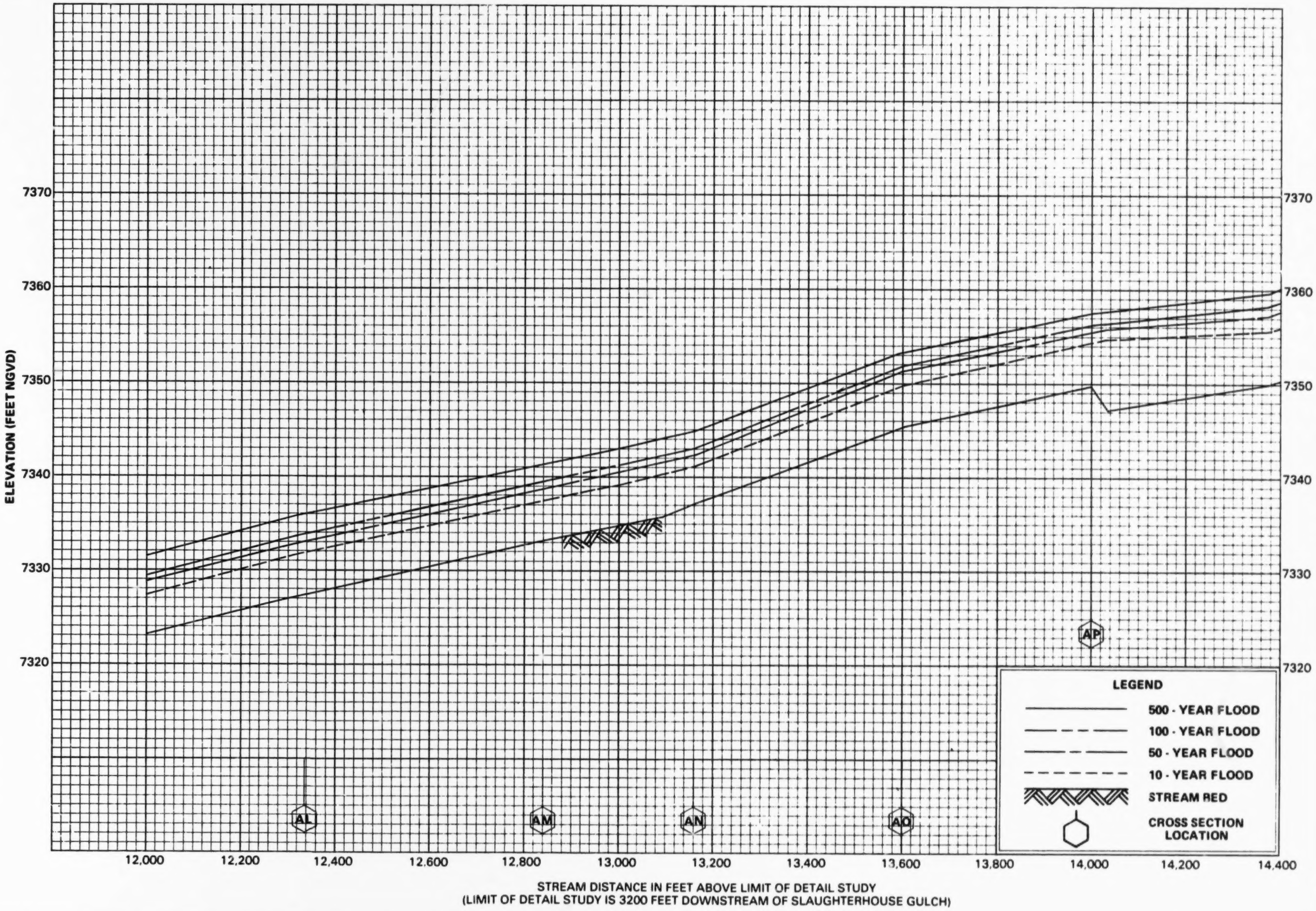
FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN MIGUEL COUNTY, CO
AND INCORPORATED AREAS

FLOOD PROFILES

SAN MIGUEL RIVER (AT PLACERVILLE)

05P



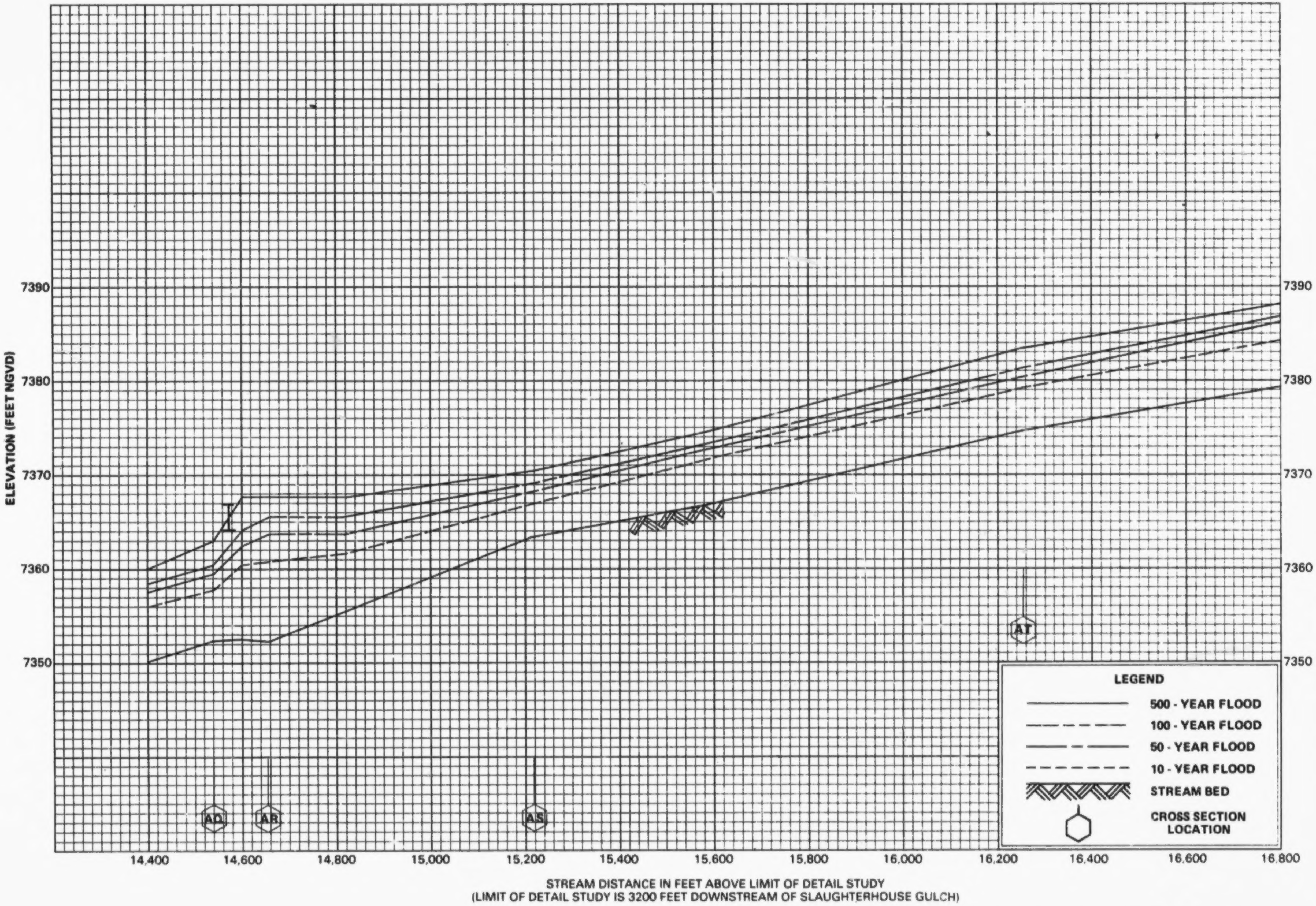
FLOOD PROFILES

SAN MIGUEL RIVER (AT PLACERVILLE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN MIGUEL COUNTY, CO AND INCORPORATED AREAS

06P



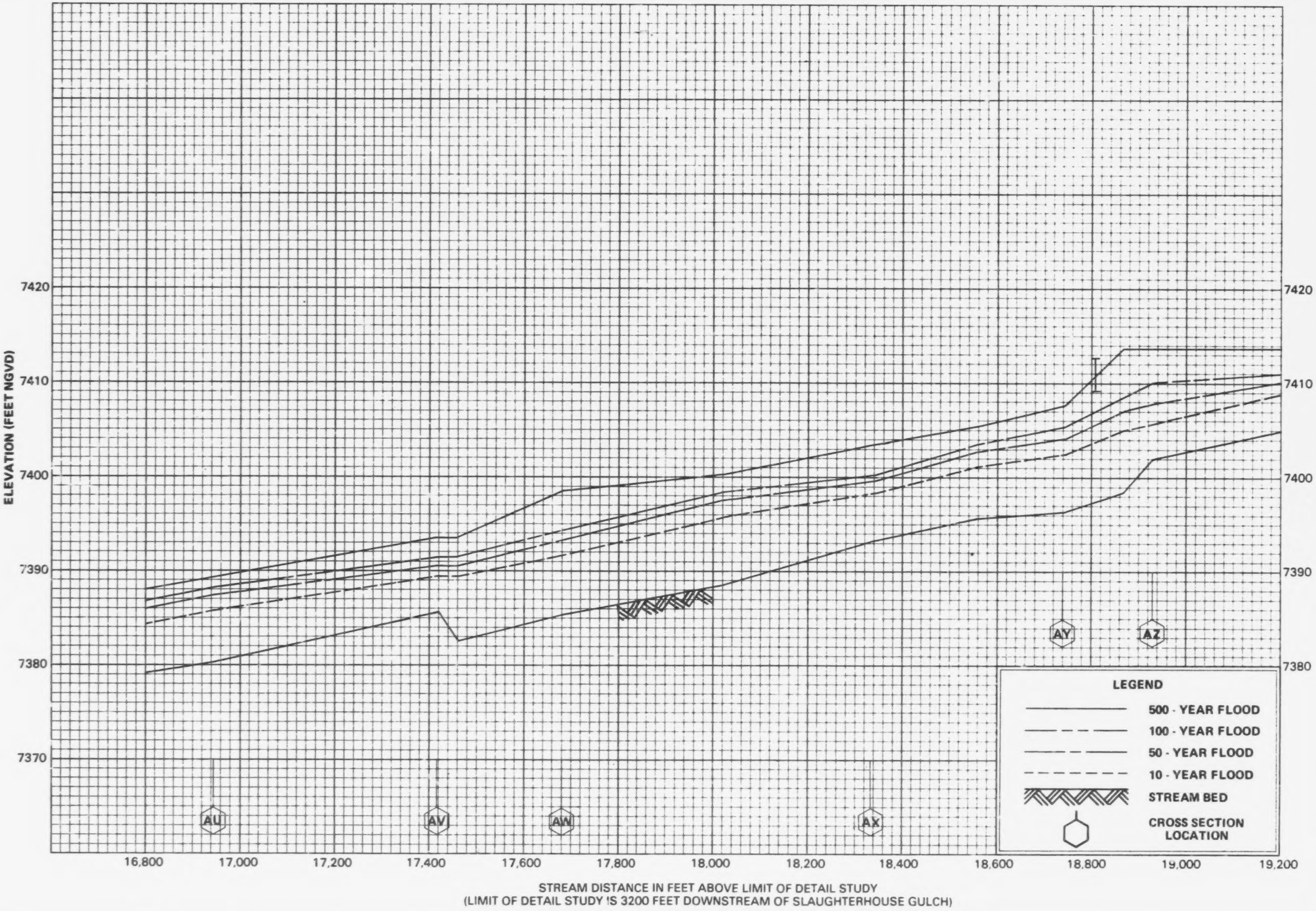
FLOOD PROFILES

SAN MIGUEL RIVER (AT PLACERVILLE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN MIGUEL COUNTY, CO
AND INCORPORATED AREAS

07P



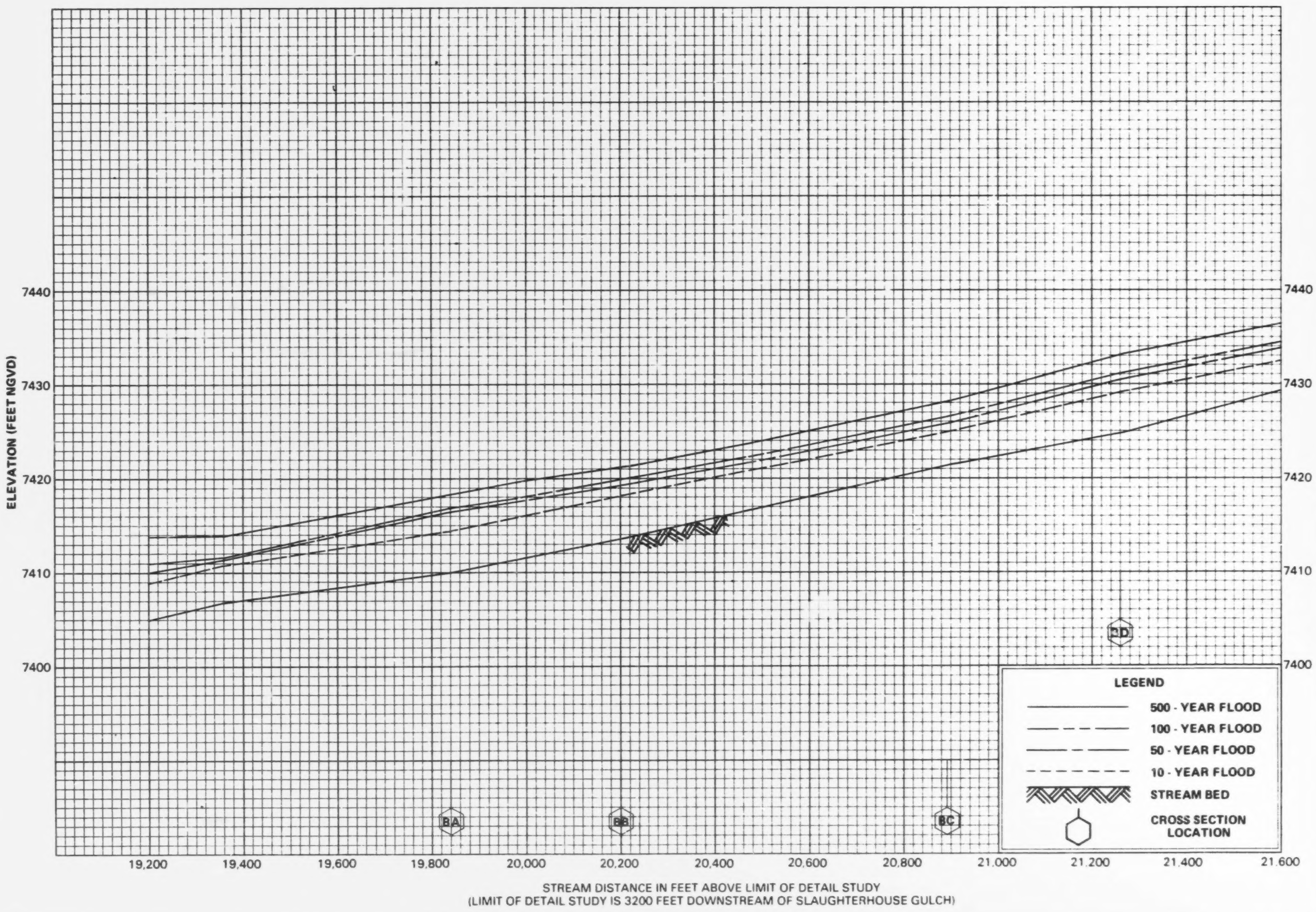
FLOOD PROFILES

SAN MIGUEL RIVER (AT PLACERVILLE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

**SAN MIGUEL COUNTY, CO
AND INCORPORATED AREAS**

08P



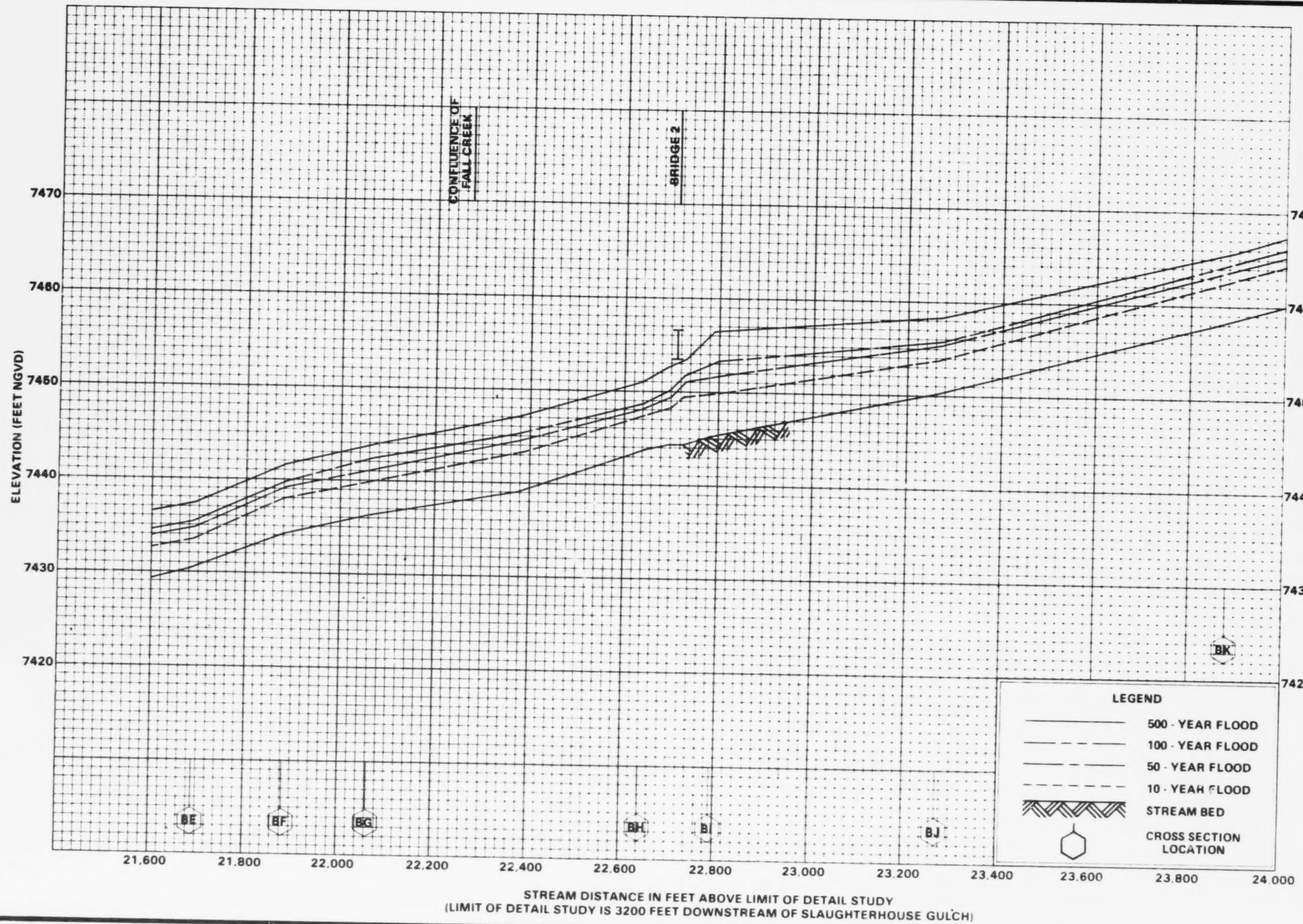
FLOOD PROFILES

SAN MIGUEL RIVER (AT PLACERVILLE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

**SAN MIGUEL COUNTY, CO
AND INCORPORATED AREAS**

09P



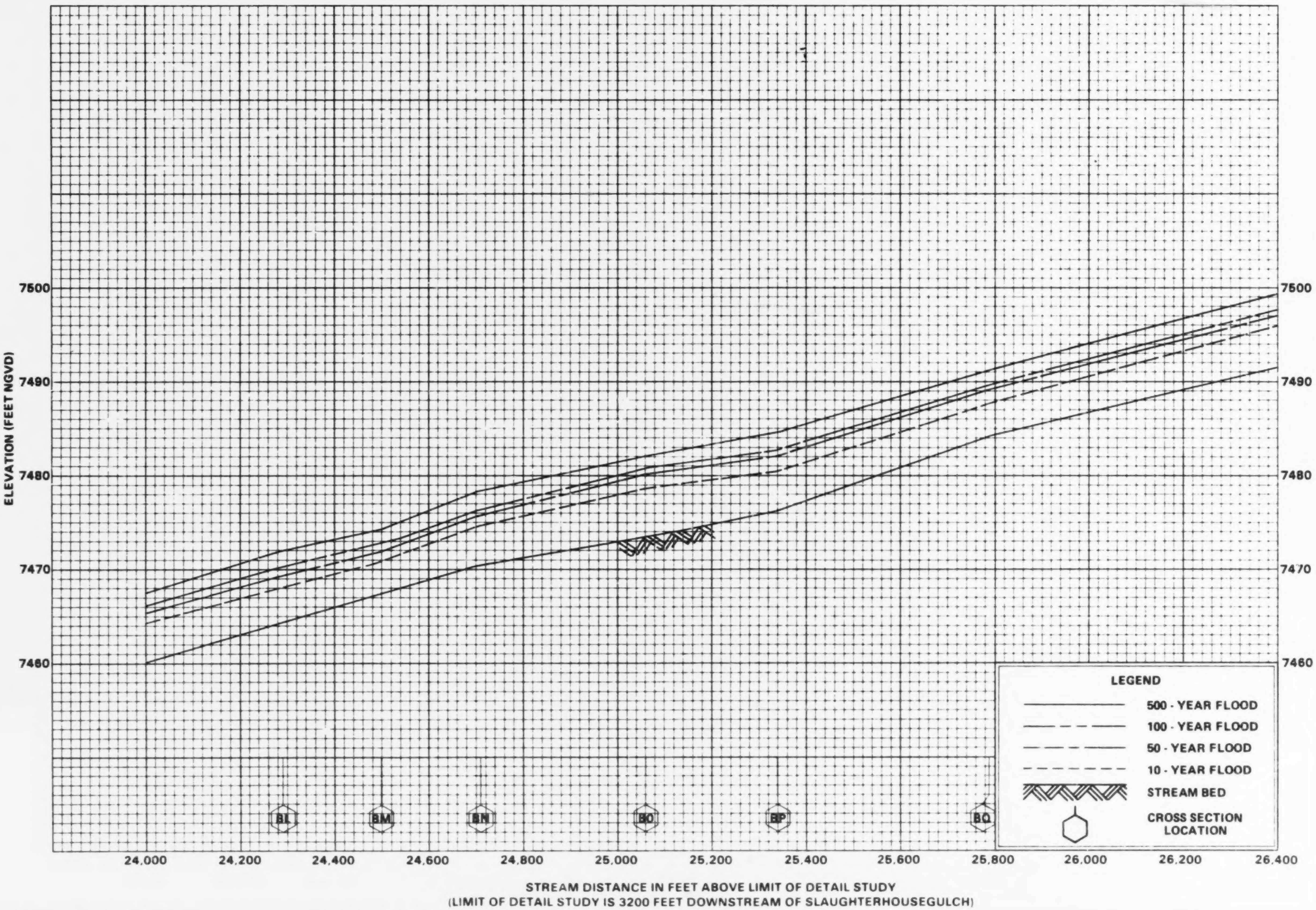
FLOOD PROFILES

SAN MIGUEL RIVER (AT PLACERVILLE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN MIGUEL COUNTY, CO AND INCORPORATED AREAS

10P



STREAM DISTANCE IN FEET ABOVE LIMIT OF DETAIL STUDY
(LIMIT OF DETAIL STUDY IS 3200 FEET DOWNSTREAM OF SLAUGHTERHOUSEGULCH)

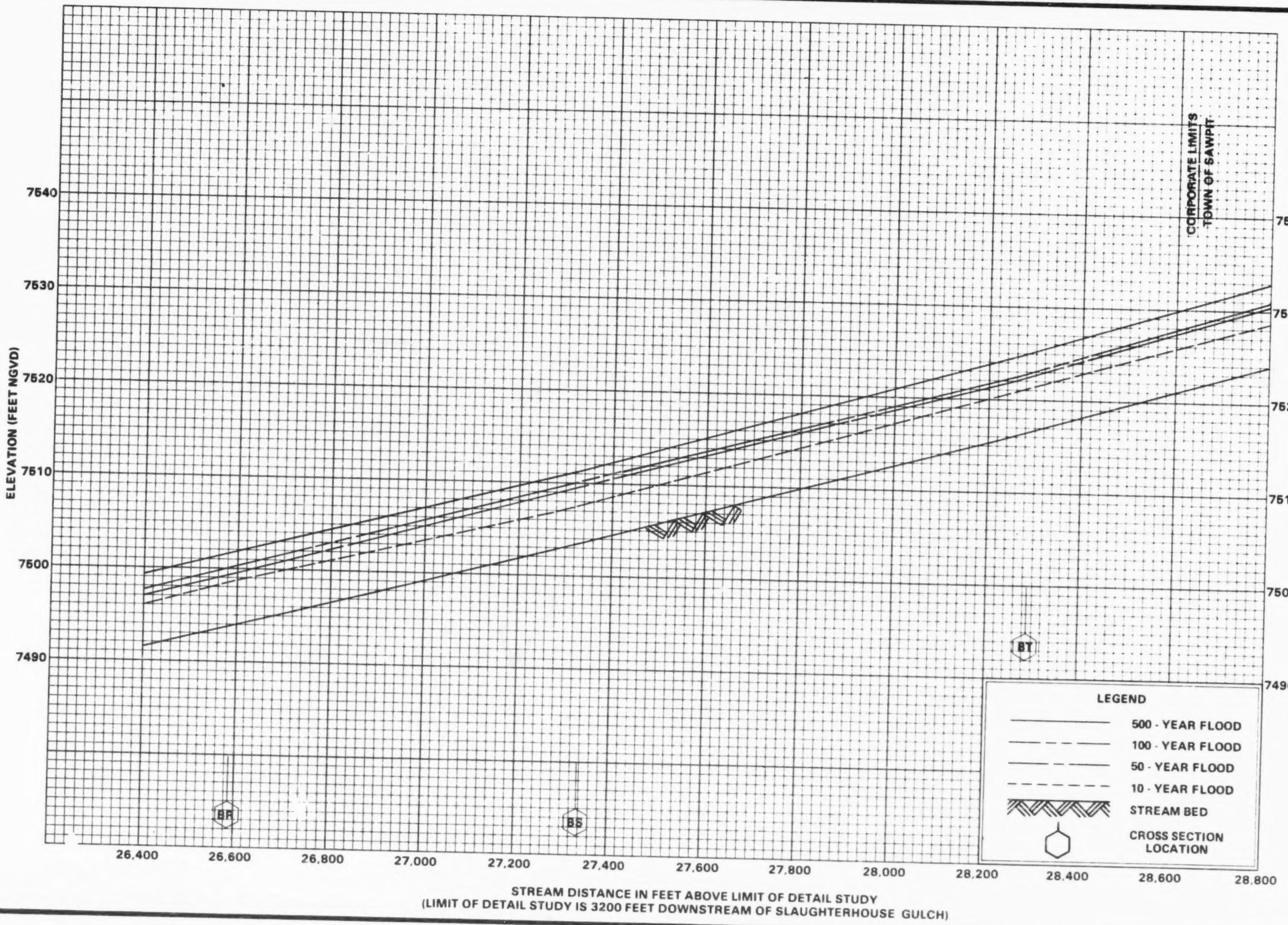
FLOOD PROFILES

SAN MIGUEL RIVER (AT PLACERVILLE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN MIGUEL COUNTY, CO
AND INCORPORATED AREAS

11P



STREAM DISTANCE IN FEET ABOVE LIMIT OF DETAIL STUDY
(LIMIT OF DETAIL STUDY IS 3200 FEET DOWNSTREAM OF SLAUGHTERHOUSE GULCH)

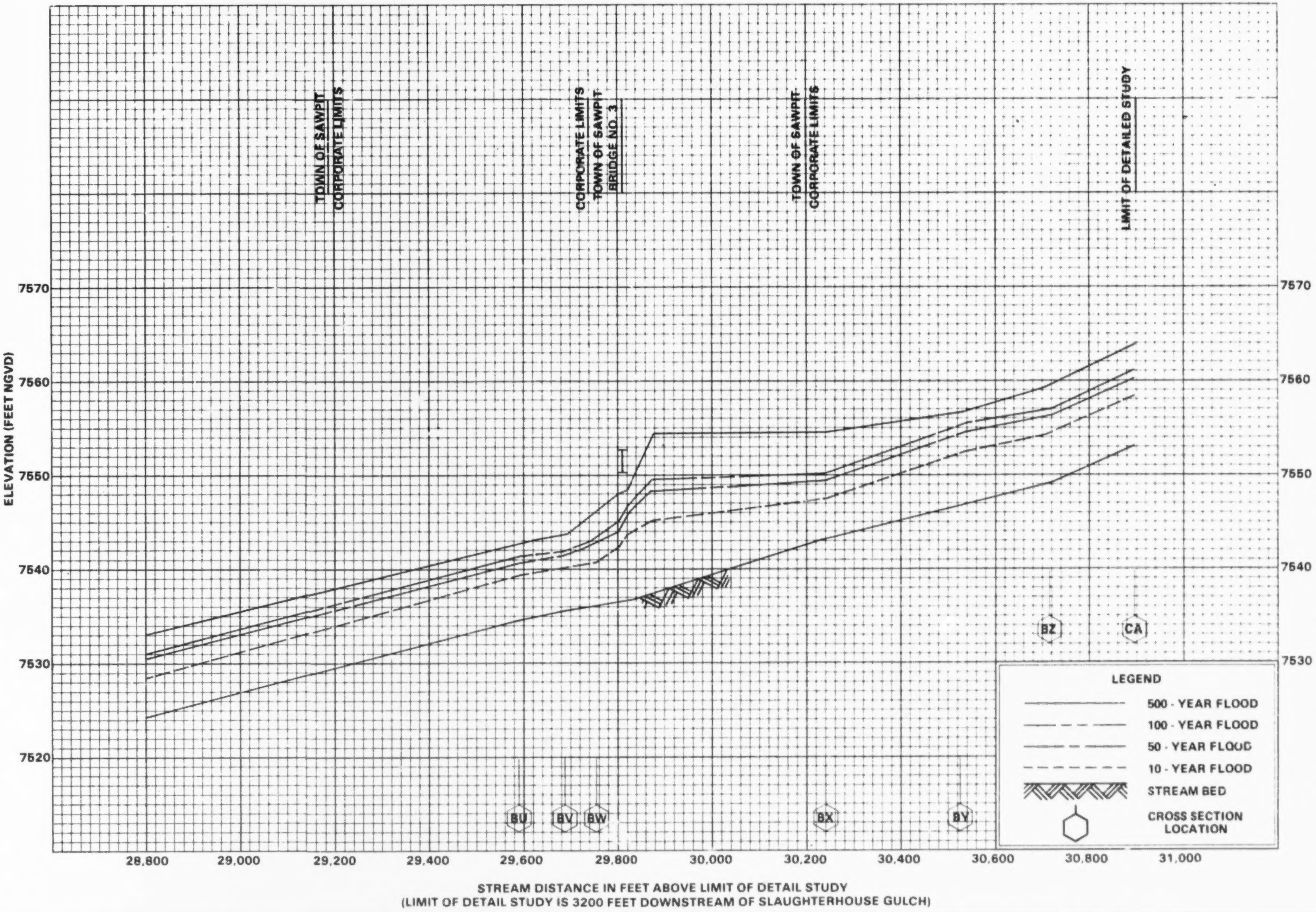
FLOOD PROFILES

SAN MIGUEL RIVER (AT PLACERVILLE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN MIGUEL COUNTY, CO
AND INCORPORATED AREAS

12P



FLOOD PROFILES

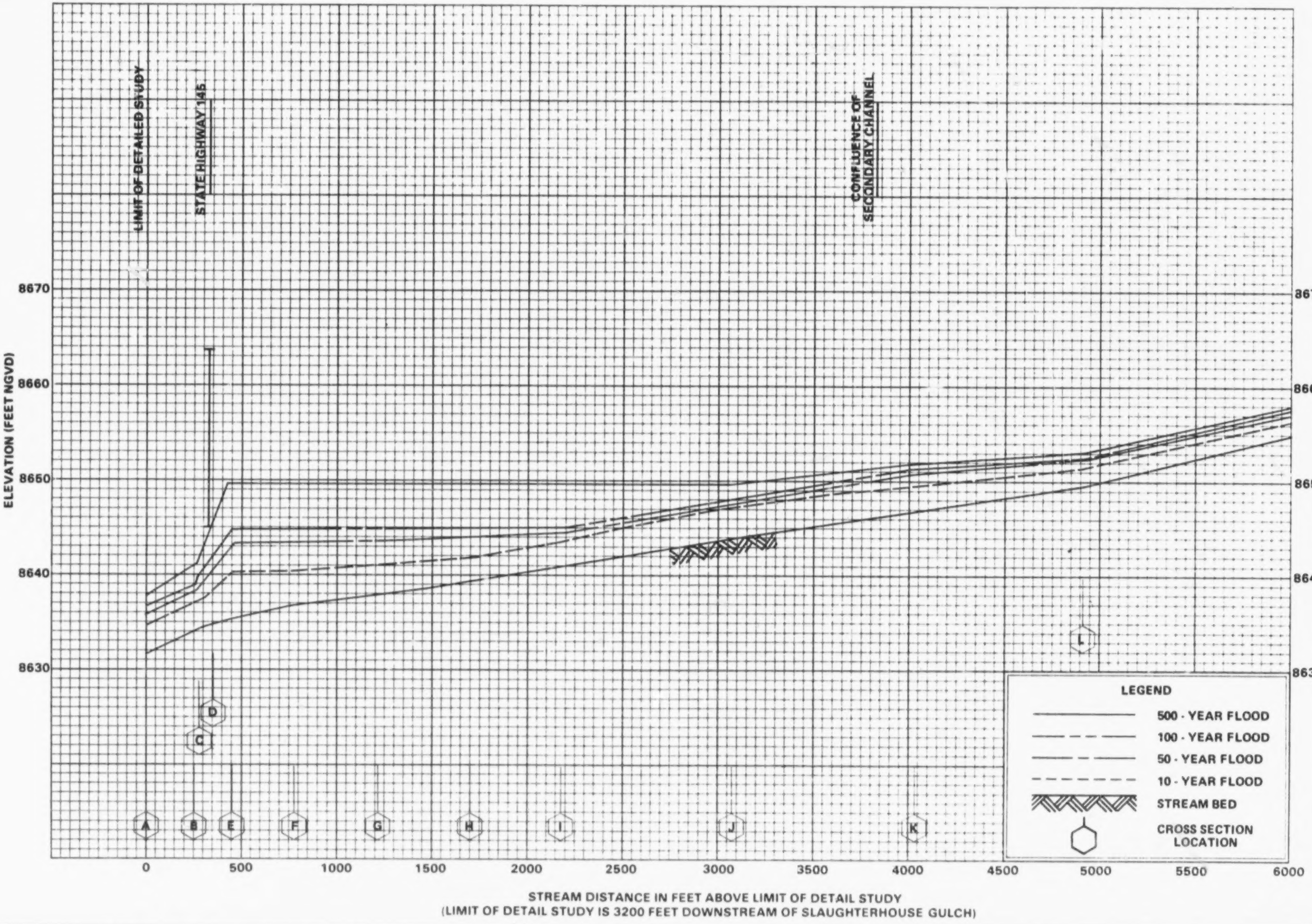
SAN MIGUEL RIVER (AT PLACERVILLE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN MIGUEL COUNTY, CO
AND INCORPORATED AREAS

13P

41



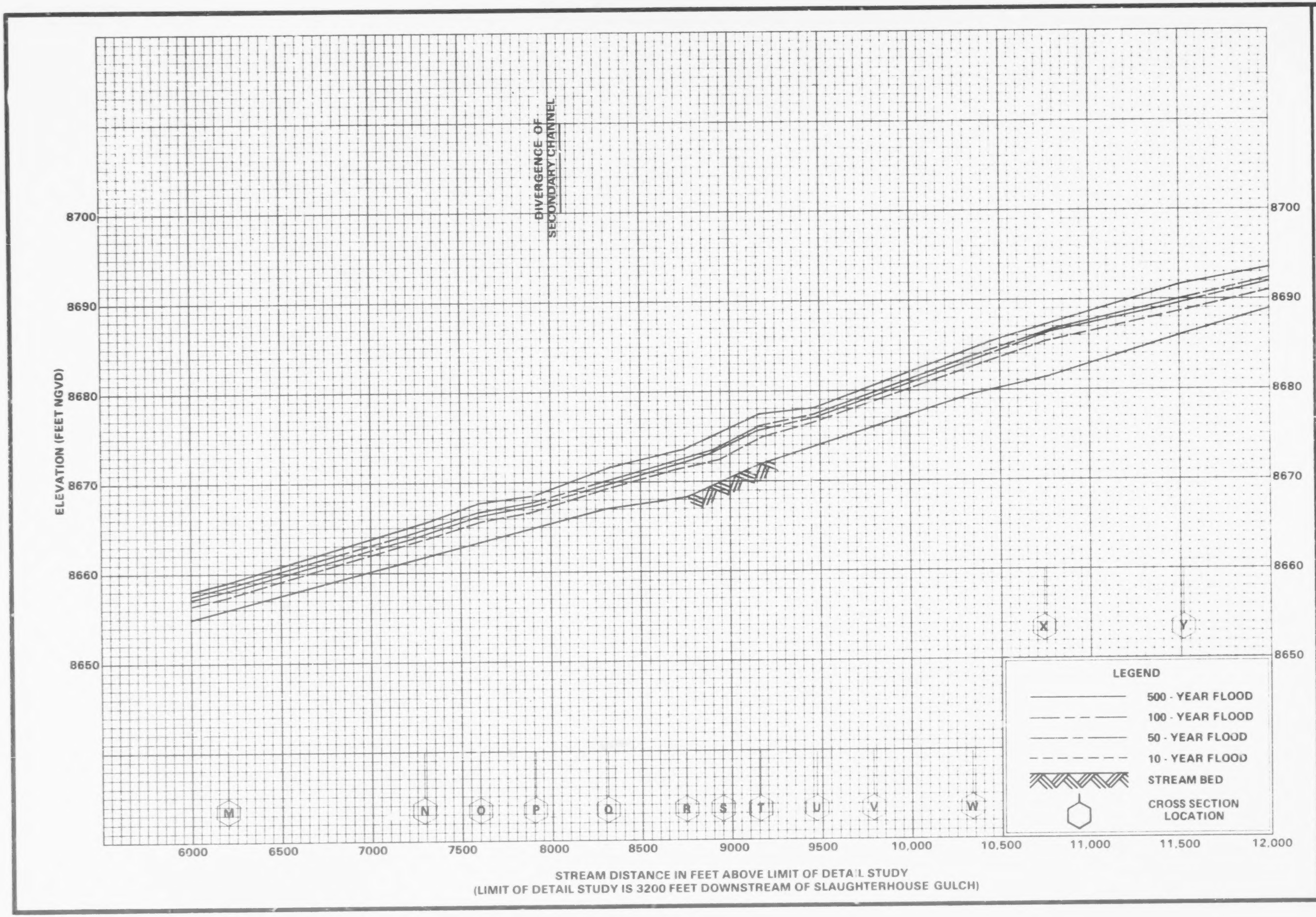
FLOOD PROFILES

SAN MIGUEL RIVER (NEAR TELLURIDE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN MIGUEL COUNTY, CO
AND INCORPORATED AREAS

14P



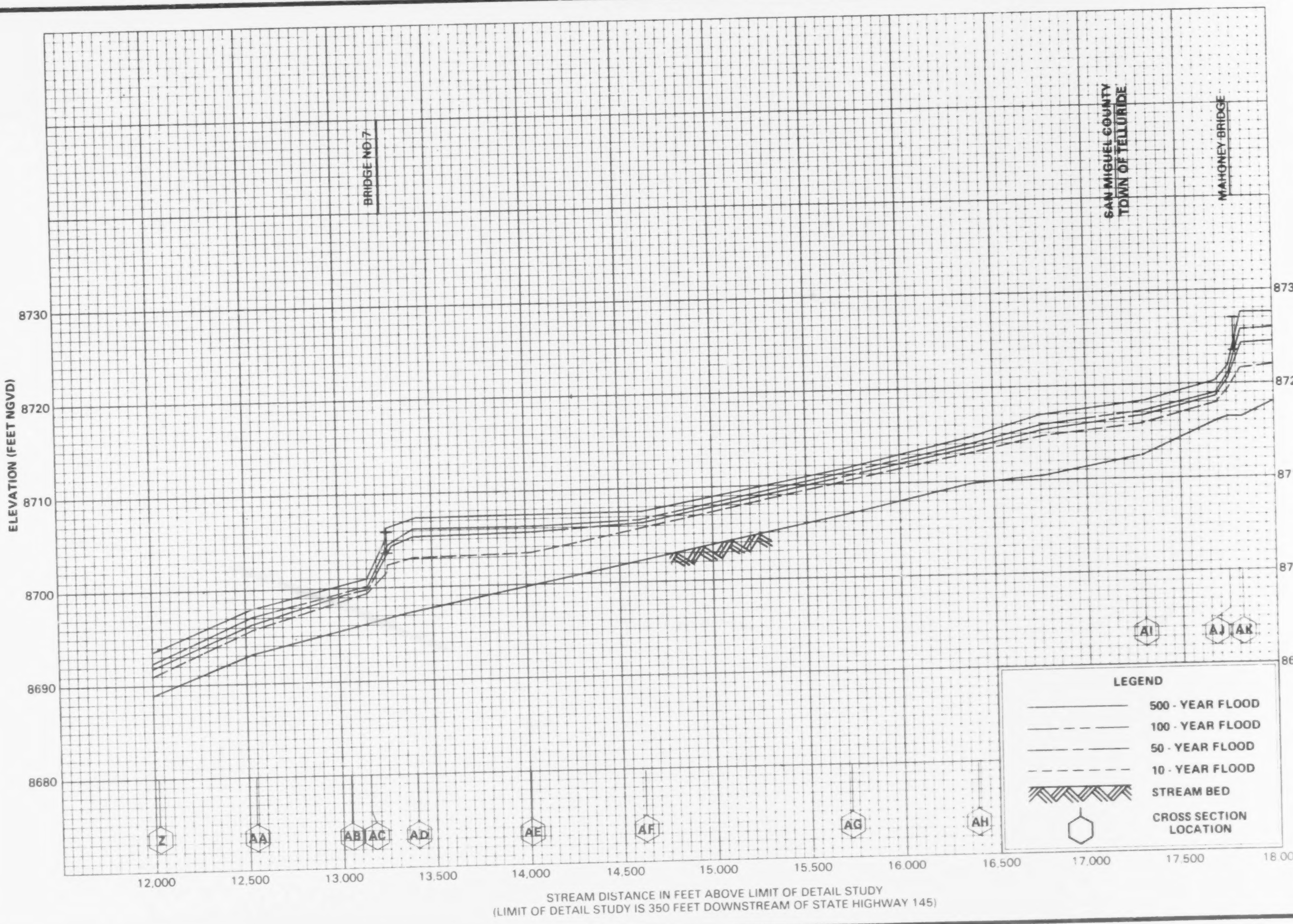
FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN MIGUEL COUNTY, CO AND INCORPORATED AREAS

FLOOD PROFILES

SAN MIGUEL RIVER (NEAR TELLURIDE)

15P



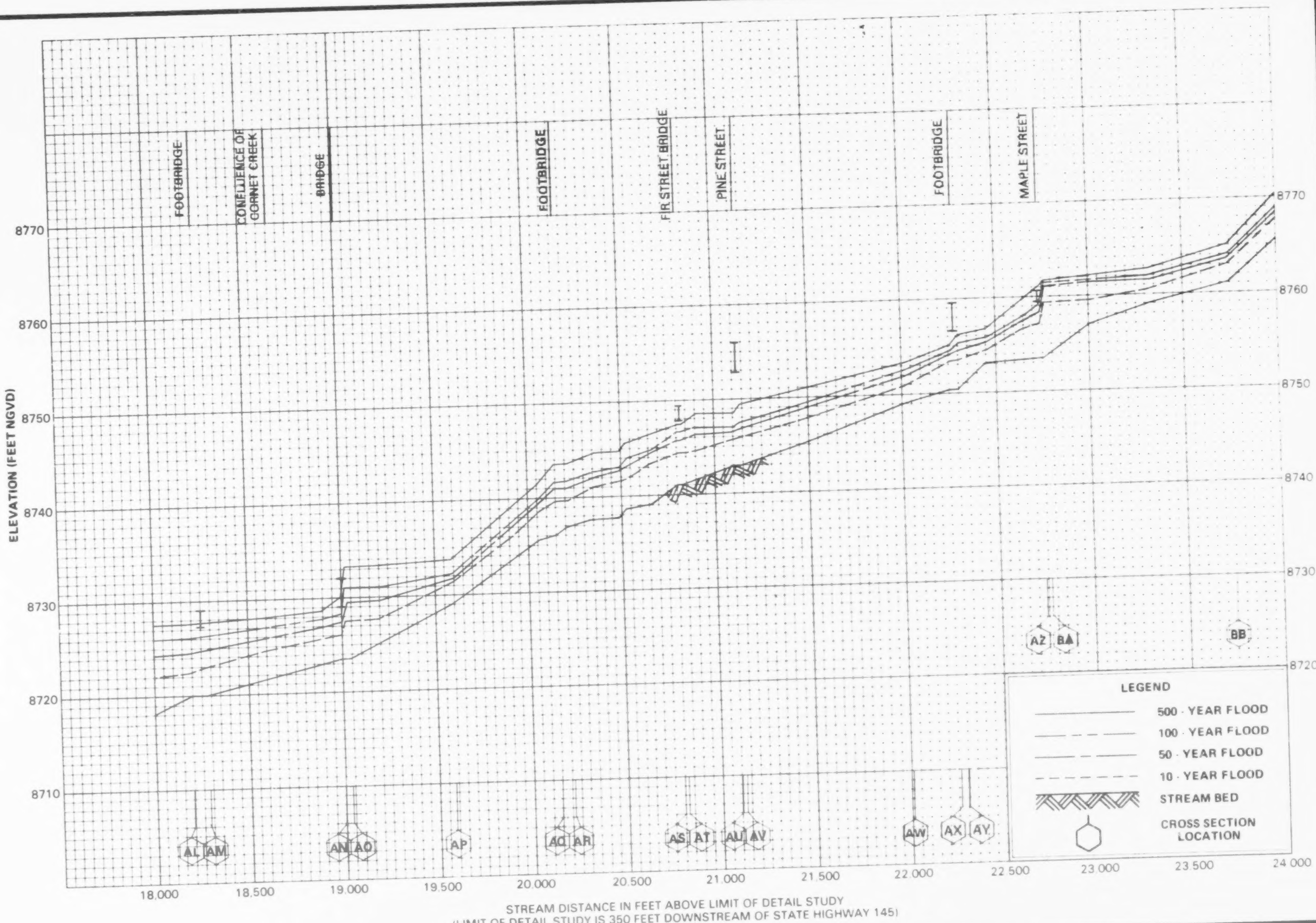
FLOOD PROFILES

SAN MIGUEL RIVER (NEAR TELLURIDE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

**SAN MIGUEL COUNTY, CO
AND INCORPORATED AREAS**

16P



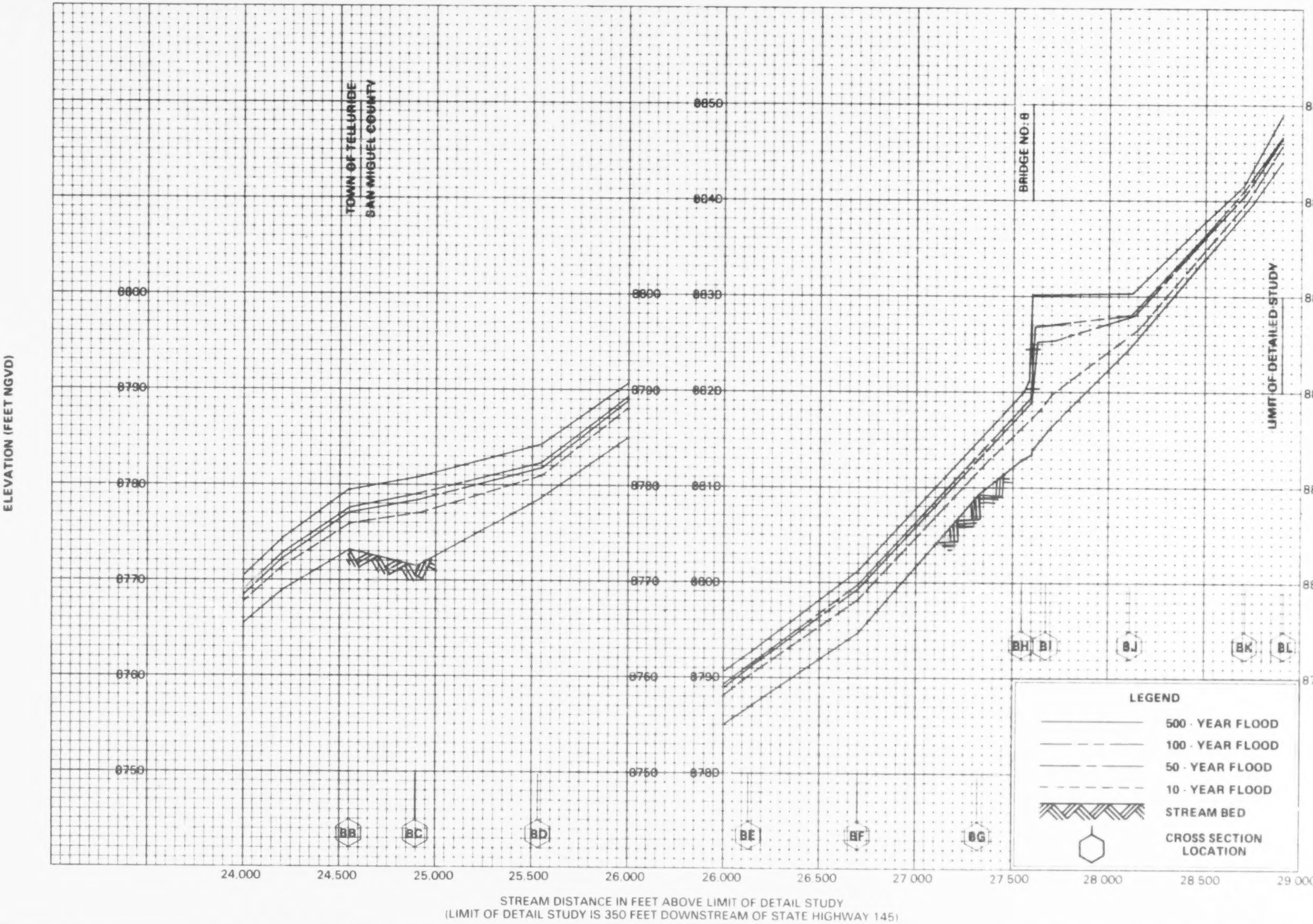
FLOOD PROFILES

SAN MIGUEL RIVER (NEAR TELLURIDE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN MIGUEL COUNTY, CO
AND INCORPORATED AREAS

17P



FLOOD PROFILES

SAN MIGUEL RIVER (NEAR TELLURIDE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

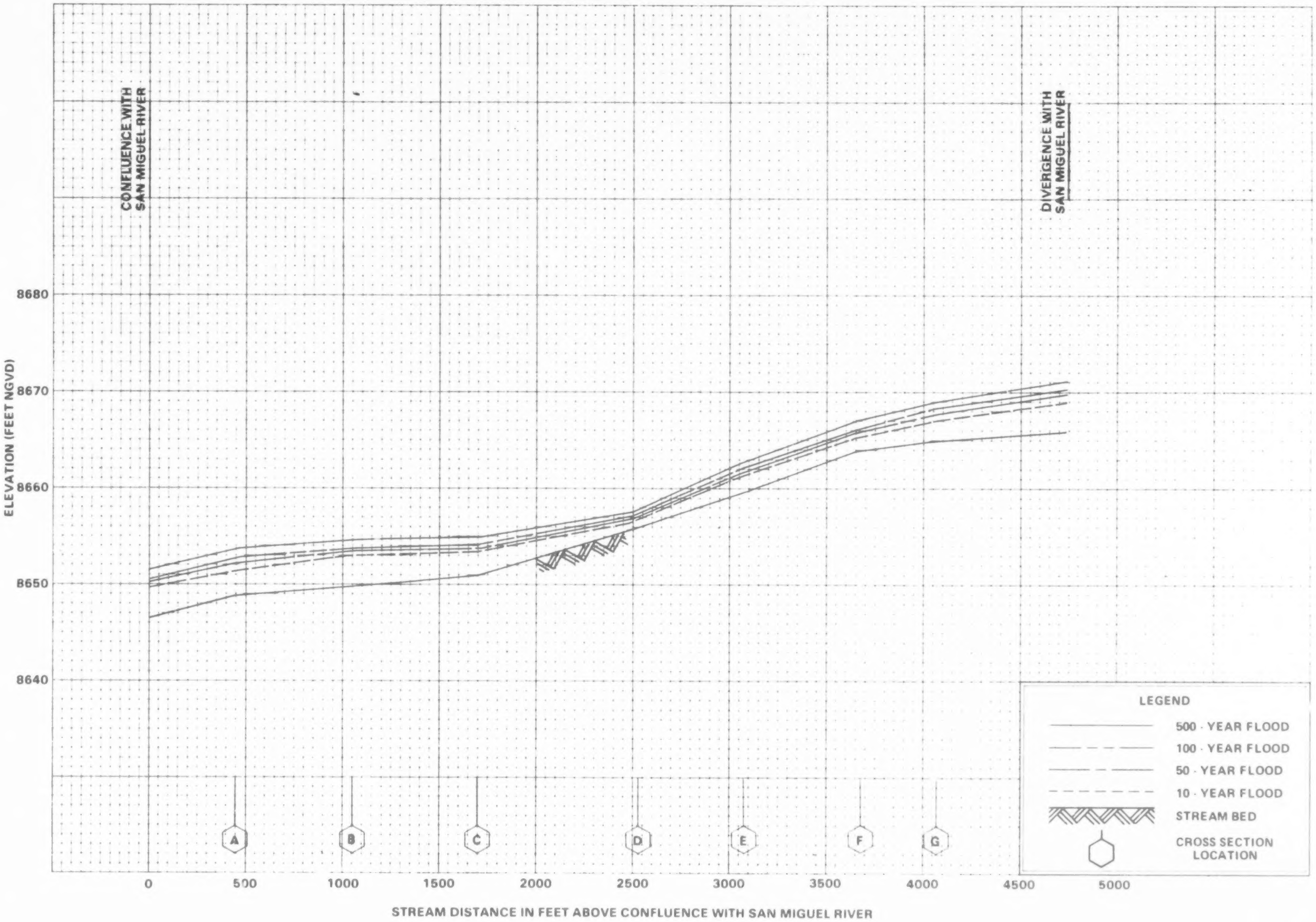
SAN MIGUEL COUNTY, CO AND INCORPORATED AREAS

18P

46

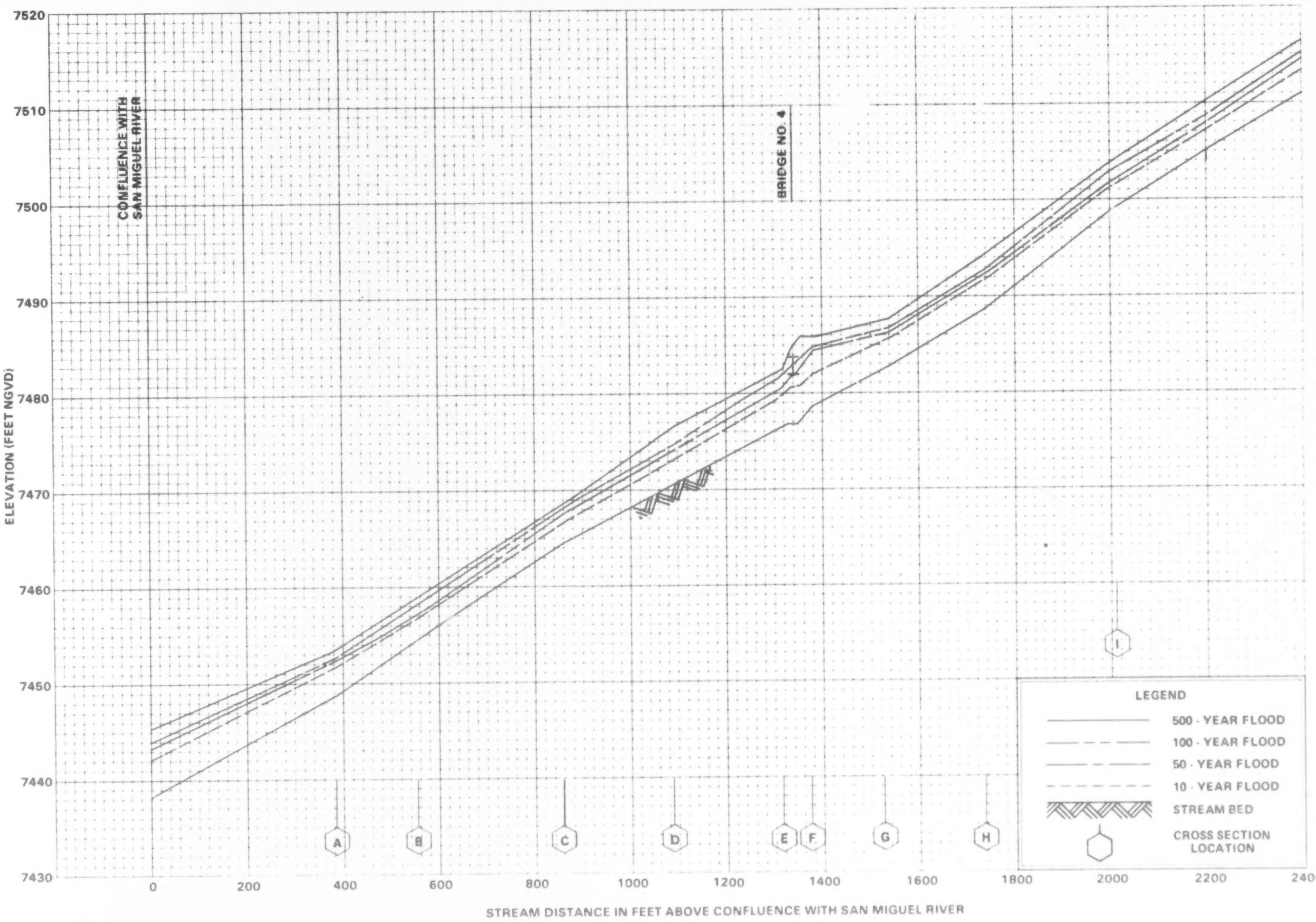
FLOOD PROFILES

SAN MIGUEL RIVER SECONDARY CHANNEL



FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN MIGUEL COUNTY, CO
AND INCORPORATED AREAS

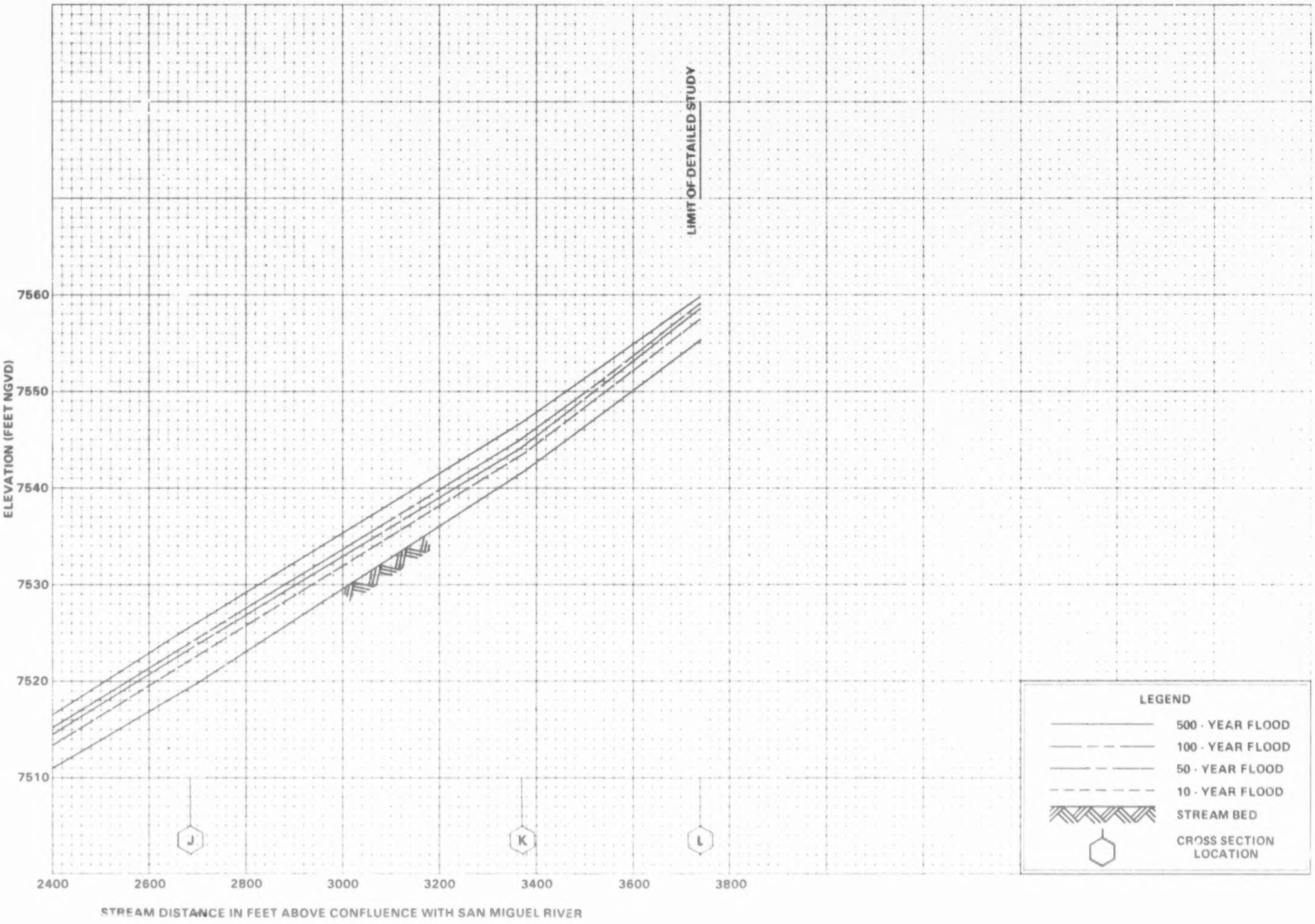


FLOOD PROFILES

FALL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN MIGUEL COUNTY, CO
AND INCORPORATED AREAS

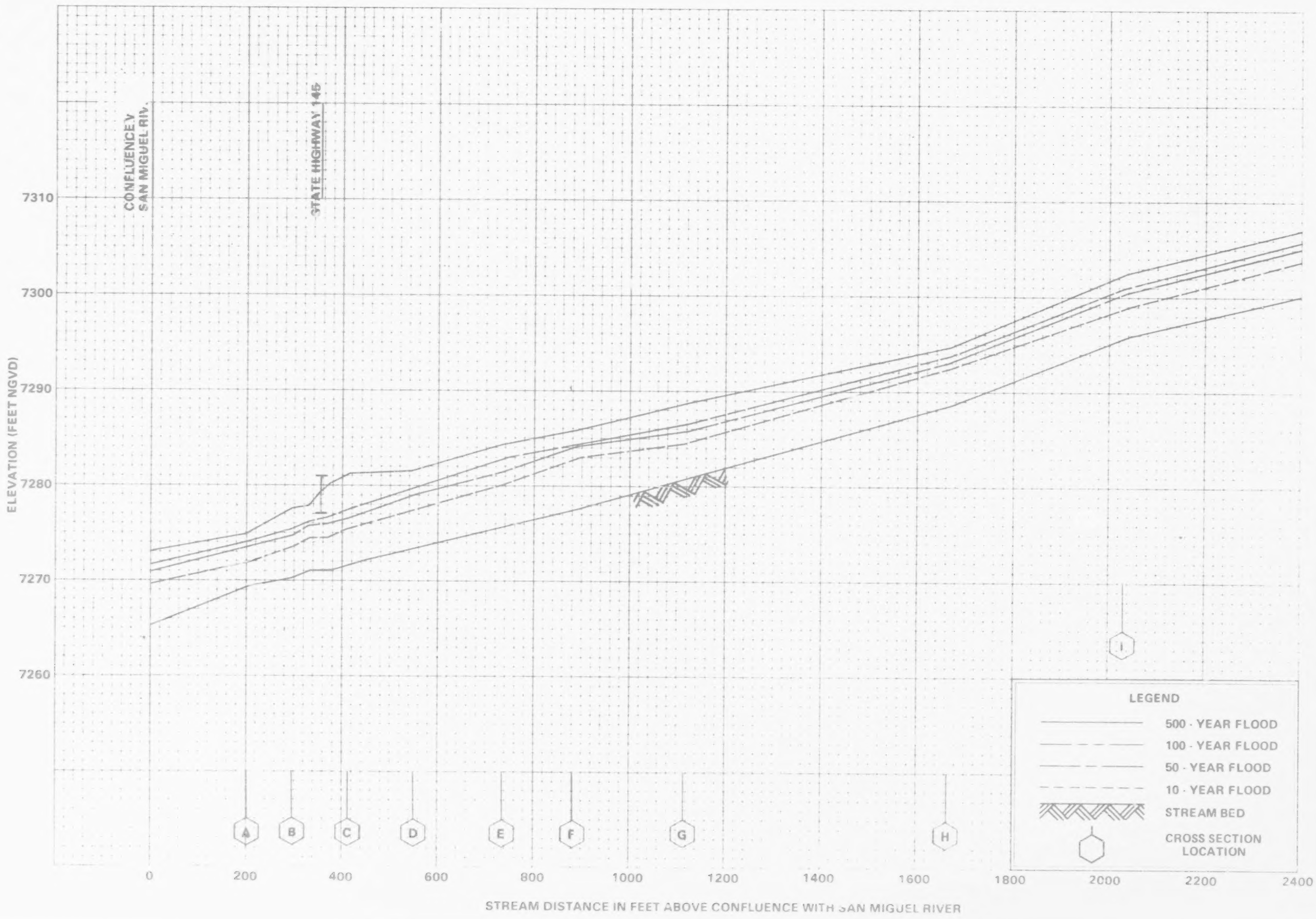


FLOOD PROFILES

FALL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

**SAN MIGUEL COUNTY, CO
AND INCORPORATED AREAS**



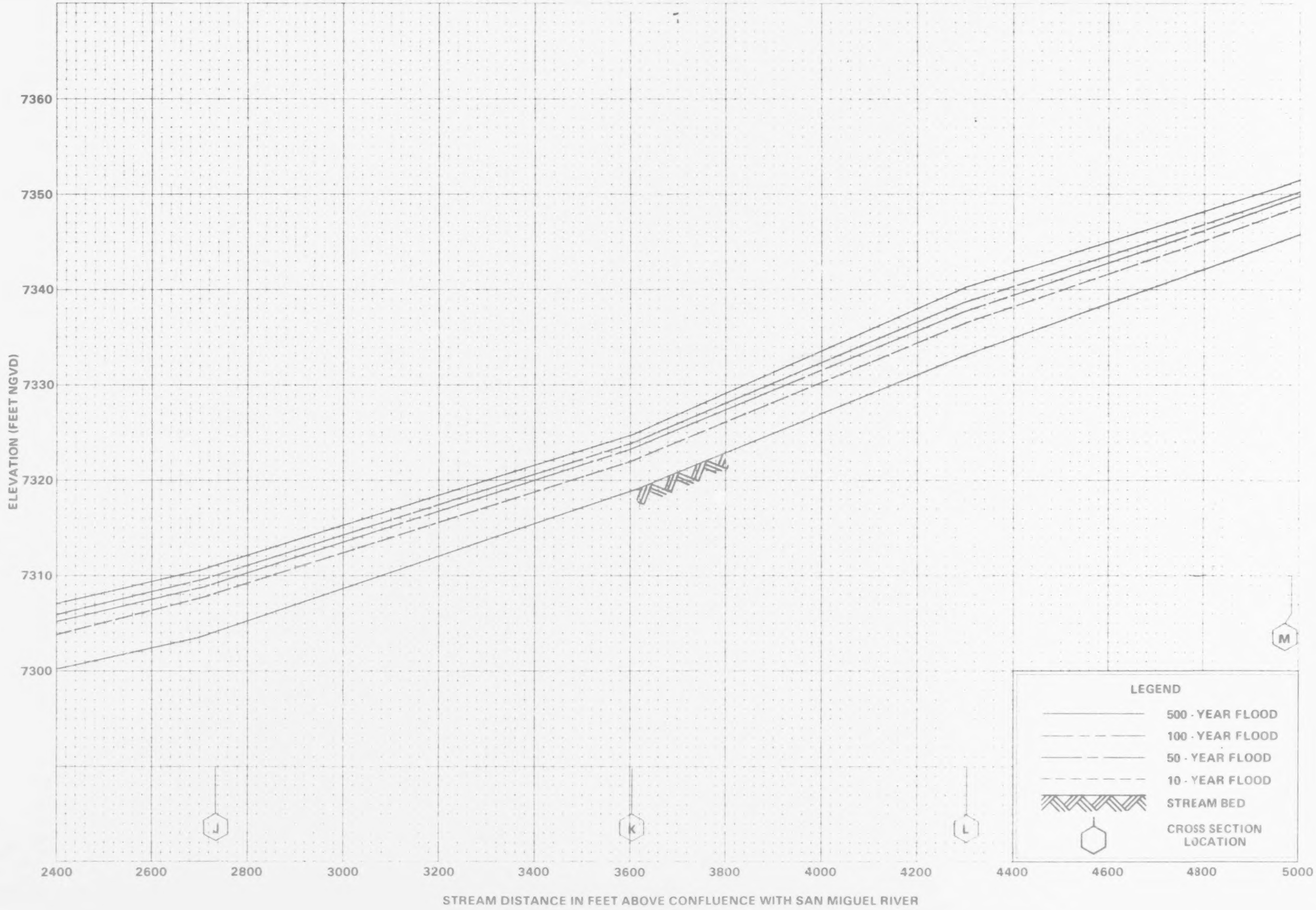
FLOOD PROFILES

LEOPARD CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN MIGUEL COUNTY, CO
AND INCORPORATED AREAS

22P

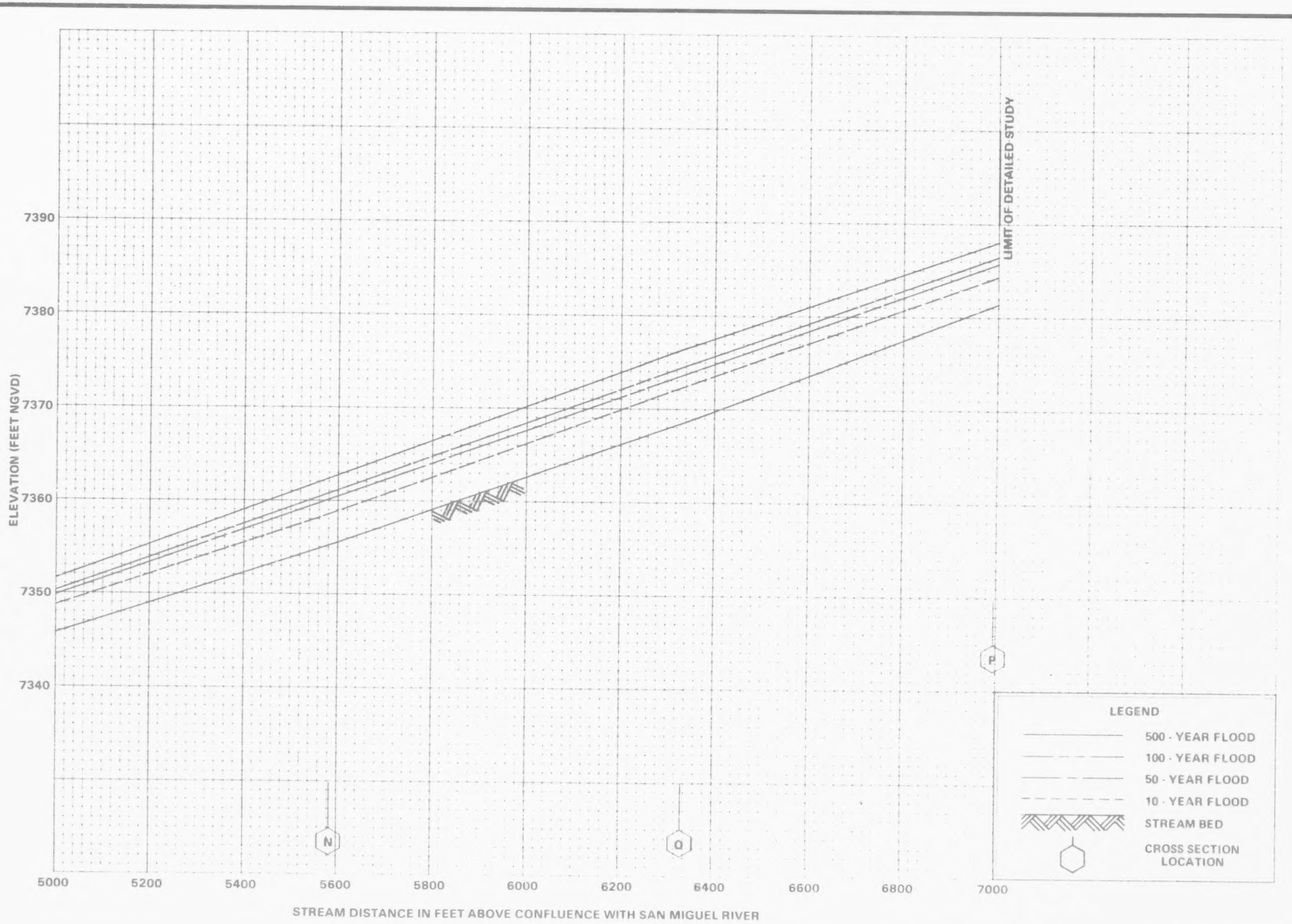


FLOOD PROFILES

LEOPARD CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY
SAN MIGUEL COUNTY, CO
AND INCORPORATED AREAS

23P



FLOOD PROFILES

LEOPARD CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

**SAN MIGUEL COUNTY, CO
AND INCORPORATED AREAS**

24P

52